



Conference report

1. Overview

A. Conference's purpose

The goal of the first multidisciplinary conference on natural and cultural history of Wadi Rum is to take stock of the research on the area. The organisation of this conference is even more important because the site was recently listed as World Heritage by UNESCO.

The title «Man and the Desert » is explicit. The conference wishes to put the man history into its context, its environment – particularly through the study of their interaction – from prehistorical times until today.

The conference aims at taking stock of research in desert environments and on the place of men in them, through the presentation of the works' results in different disciplines, from natural sciences and human and social sciences.

B. Conference's development

Comité scientifique

- Ms. Saba Farès, Maître de conférences, Département des sciences humaines et sociales, Université Nancy 2, France
- Ms. Géraldine Chatelard, Chercheur associé, Département des études contemporaines, Institut français du Proche-Orient (Ifpo), Amman, Jordanie
- Mr. Sawsan Fakhri, Head of the Aqaba Regional Office, Jordanian Department of Antiquities, Aqaba, Jordanie
- Mr. Fares Khoury, Associate Professor, Department of Biological Sciences, Hashemite University, Zarqa, Jordanie
- Prof. Bernard Smith, School of Geography, Archaeology and Palaeoecology, Queen's University, Belfast, Irelande

Institutional partners

- Aqaba Special Economic Zone Authority (ASEZA)
- Ministère des affaires étrangères, Ambassade de France en Jordanie
- Université Nancy 2
- Université Lyon 2

- Centre National de la Recherche Scientifique (CNRS) – Groupe de recherche et d'études sur la Méditerranée et le Proche-Orient (GREMMO)
- Institut Français du Proche-Orient (IFPO)
- Institut Français en Jordanie

The conference took place from Friday, November 11, to Sunday, November 13, 2012, at the Visitors' Centre of the Wadi Rum Protected Area. Participants were housed at Beit Ali Camp. The conference was under the patronage of HRH Princess Sumaya bint El Hassan, Vice-chairman of the Board of trustees, Jordan Museum and President of El Hassan Science City, President of The Royal Scientific Society.

Conference programme

Mr. Salim Al-Moghrabi, ASEZA Chief Commissioner for Environment and Health, introduced the speeches of the conference's opening ceremony :

- Speech of Ms. Saba Farès, Maître de Conférences, Université Nancy 2, co-organizer of the conference
- Speech of Ms. Maysa Shahateet from USAID/Siyaha
- Speech of Mr. Issa Ayyoub, Chief Commissioner of Aqaba Special Economic Zone Authority
- Speech of Mr. Mostafa Mihraje, Premier Conseiller de l'Ambassade de France en Jordanie
- Speech of HRH Princess Sumaya bint El Hassan, Vice-chairman Board of trustees, Jordan Museum et President of El Hassan Science City, President of The Royal Scientific Society.

The first day of the conference was devoted to the natural history of Wadi Rum, to geology and geomorphology, climate and climate changes studies, ecosystem, animal and plant studies.

The second day of the conference focused on the cultural history of Wadi Rum. The following questions were mentioned :

- religion, society and economy in Antiquity and early Islam
- history, society, culture and economy in contemporary times
- the collecting system of rainwater from antiquity to the present time

During the round table of the third day, the topics of conservation and heritage management were discussed about. The afternoon was devoted to a field visit. Some experts presented their work on site.

C. Participants

More than one hundred and twenty people attended the conference, including many professionals, experts in the field developed, including :

Natural sciences and environmental management:

Dr. Salim Al-Moghrabi, ASEZA Chief Commissioner for Environment and Health
Prof. Bernard Smith, Queens University, Belfast (Geomorphology)
Prof. Thomas Paradise, University of Arkansas (Geomorphology and Heritage Management)
Prof. Yann Callot, Université de Lyon (Paleo-environment)
Dr. Hani Alnawafleh, Hussein Bin Talal University (Geology and Rock Conservation)
Dr Patricia Warke, Queens University, Belfast (Physical Geography and Rock Conservation)
Dr. Fares Khoury, Hashemite University (Animal Ecology)
Dr. Linda Herveux, French National Centre for Scientific Research (Botany)
Dr. Nicolas Jacob, Université de Lyon (Geography)
Dr. Fadi Bala'awi, Hashemite University (Conservation Science)
Eng. Nash'at Hmeidan, Royal Society for the Conservation of Nature (Ecology)
Eng. Jamal Zaidaneen, Abu Dhabi Environment Agency (Wildlife Conservation)
Eng. Mahmud Bdur, USAID, former WRPA Manager (PA Management)

Human and social sciences and cultural management

Prof. Abdel Aziz Al-Mani', King Saud University (History)
Prof. Zeidan Kafafi, Yarmouk University (Prehistory)
Prof. Donald O. Henry, University of Tulsa (Anthropology)
Dr. Saba Fares, Université de Nancy (History and North Arabian Epigraphy)
Dr. Zeyad Salameen, Al-Hussein Bin Talal University (Islamic Epigraphy and Archaeology)
Dr. Sawsan Fakhri, Department of Antiquities (Archaeology)
Dr. Dennine Dudley, University of Victoria (Archaeology)
Dr. Barbara Reeves, Queen's University (Archaeology)
Dr. Géraldine Chatelard, Institut français du Proche-Orient (History and Social Anthropology)
Ms. Laura Strachan, Ph.D. candidate, University of British Columbia (Social Anthropology)

2. Scientific results

A. Conference's goals

Wadi Rum, in southern Jordan, was recently registered as natural and cultural heritage in the UNESCO World Heritage list. If the UNESCO's World Heritage registration is not the purpose of the conference, its organization takes place in the wish of enhancing Wadi Rum's splendours, through the presentation of the studies on the natural and cultural history of the area, led by international scholars who have been on the site for several years.

Why a multidisciplinary conference on Wadi Rum ?

- Wadi Rum has a rich natural and cultural history. If the natural beauties of the site attracts hundreds thousands of tourists, the historic and natural heritage is less known.
- The current scientific knowledge about the region is not easily available for those who implement and participate in the implementation of the management policy of the site.

- The meeting of specialists and the enhancement of their work is essential to provide technical advice to authorities in monitoring the conservation of natural and cultural heritage of the site.

The aim of the conference is to develop a strategy for the future of the research on Wadi Rum, and to make proposals and recommendations for competent authorities in management and monitoring of natural and cultural heritage in the context of tourism development.

B. Summary

Natural sciences

Wadi Rum is one of the world's iconic sandstone landscapes that integrates the detail of distinctive patterns of localized rock weathering with large scale landscape evolution controlled both by the intrinsic properties of the rocks and a complex tectonic and structural history. This mix of influences has created in effect a 'natural laboratory' in which some of the key issues of desert geomorphology can be explored. Included in these is the question, central to general models of landscape evolution, of how vertical elements (cliffs) are maintained in the landscape through basal erosion and the effective removal of slope-foot debris. The role of groundwater seepage in this process also opens the door to an exploration of how past climatic conditions influenced seepage, associated weathering and landscape change through the formation of caves and caverns that locally undermine cliffs. Such areas of natural seepage have always been important for human habitation, and an understanding of the geomorphological processes that operate in the area continues to have relevance for archaeological studies through, in particular, the impact of weathering and retention of rock art. In a wider context, this understanding of process is vital for future landscape conservation, both in terms of identifying areas of special scientific interest and areas of greatest sensitivity to change that require enhanced and often very specific protection. Invariably this encompasses not only the physical landscape but also the habitats that derive from it. Through this an understanding of the geomorphology of Wadi Rum is essential for the successful application of an ecosystem-based approach to environmental conservation, which is itself essential for the long-term sustainability of the area. In support of this 'holistic approach' to understanding the environment and its conservation, the proposed conference will attempt to integrate across a wide variety of fields including: Geology, Geomorphology, past and present Climatology, Botany, Plant Ecology, Animal Ecology and the conservation and management of natural heritage.

Human and social sciences

The outstanding landforms of Wadi Rum have played an essential role in fostering human settlement in the area and enhancing the development of sophisticated intellectual activity. Spanning at least 12,000 years, one of the world's richest collections of rock art and epigraphy is housed at the site. This wealth of documentation enables an understanding of the relation between settled and mobile lifestyles over an extremely long period of time. Factors underpinning this relationship have been a combination of environmental constraints

and of successive social, economic and political forces both external and domestic. In the early Prehistory human settlement was fostered by a wetter climate and more abundant sources of water. Particularly relevant to contemporary concerns about climate change, the existing record of resource use in Wadi Rum illustrates the adaptability of human communities who have made the most of scarce resources to sustain continuous presence after the climate became dryer in the Bronze Age. Rock art documents the presence and disappearance of specific animal species, either wild or domesticated, in response to climate change. Archaeological remains testify to cycles of agricultural activities (cultivation of olives and other crops, domestication and breeding of various types of livestock) based on sophisticated systems of rainwater harvesting (dams, channels, reservoirs, and sunken cisterns). Recent epigraphical and archaeological studies allow to revisit historical knowledge about the role of Wadi Rum as a religious and commercial centre in pre-Islamic North Arabia, and to identify the site with Iram, mentioned in the Qur'an. These studies are also important for a history of writing in the Arabian Peninsula. Knowledge about Wadi Rum would benefit from the insight of other archaeological studies conducted in the Hisma basin and Maan region. This would allow to understand the site in its broader regional environment, and to fill a knowledge gap spanning the classical Islamic periods and the Ottoman era. Presently, the Wadi Rum area is mainly used for tourism and, to a lesser extent, pastoralism, both activities that remain complementary for the local Bedouin populations. Large agricultural projects have also been developed around Disah. Change in the use of the site, and particularly increased numbers of visitors, present economic opportunities but also social, cultural and environmental challenges that need to be addressed through adequate management and monitoring measures, particularly in the Wadi Rum Protected Area and its buffer zone. Scholars having conducted research in Wadi Rum and relevant other sites in the South-East of Jordan will be invited to present their findings in the following disciplinary areas: Archaeology, Epigraphy, Anthropology, History, Human Geography, conservation and management of tangible and intangible cultural heritage.

C. Results and perspectives

It is not the place for a scientific appraisal. Each paper is already a statement of several years of research. It is proper to show the benefits of an on-site meeting of scientists, researchers and scholars, as well as the contribution to the diffusion of their research to local communities and authorities.

The round table on the morning of the last day of the conference was an opportunity to summarize the ideas and to think about the possible forms of collaboration between scholars, authorities and local population. The main points and the initial conclusions discussed are the following :

- Necessity to expand the protected area of Wadi Rum to buffer zones
- Necessity to list the full natural and cultural sites in order to make an inventory
- Proposal for the constitution of databases to share knowledge on Wadi Rum

- Proposal to build a research centre on the Wadi Rum, which would be the place of enhancement of scientific studies, host venue for the protagonists of the site development
- Necessity to communicate the richness of the site through edition of brochures, guidebooks,... and a map listing the main sites. However, the risk of human degradation is raised with these localizations.
- Making people be aware of the importance of the Wadi Rum's heritage and showing the benefits of being on the UNESCO World Heritage list, taking examples from other sites around the world.
- Importance in conceiving and implementing a place of awareness, education to the conservation and protection of natural and cultural heritage and a museum or an interpretation centre to spread knowledge about the Wadi Rum, its history and its natural and cultural heritage, to the widest audience
- Importance of establishing a backup strategy of protection and conservation of heritage ; to protect it from natural and human degradation
- Proposing recommendations to the competent authorities in management and monitoring of natural and cultural heritage ; providing technical advice to authorities
- Importance of training of staff, awareness and education of local people and tourism protagonists

This conference highlighted the importance of regular updates on scientific research in Wadi Rum, to publish the conference contents, and the importance of a close cooperation with local authorities in implementation of development programs, enhancement and protection of the site.

3. Financial results

A. Funding resources

The conference received financial support from Aqaba Special Economic Zone Authority (ASEZA), manager of the protected area of Wadi Ramm, up to 16 992,43 JOD, from the Service de Coopération et d'Action Culturelle de l'Ambassade de France à Amman, up to 8 000€ and 3 000€, and the Université Nancy II (5200€) and GREMMO-CNRS (3900€).

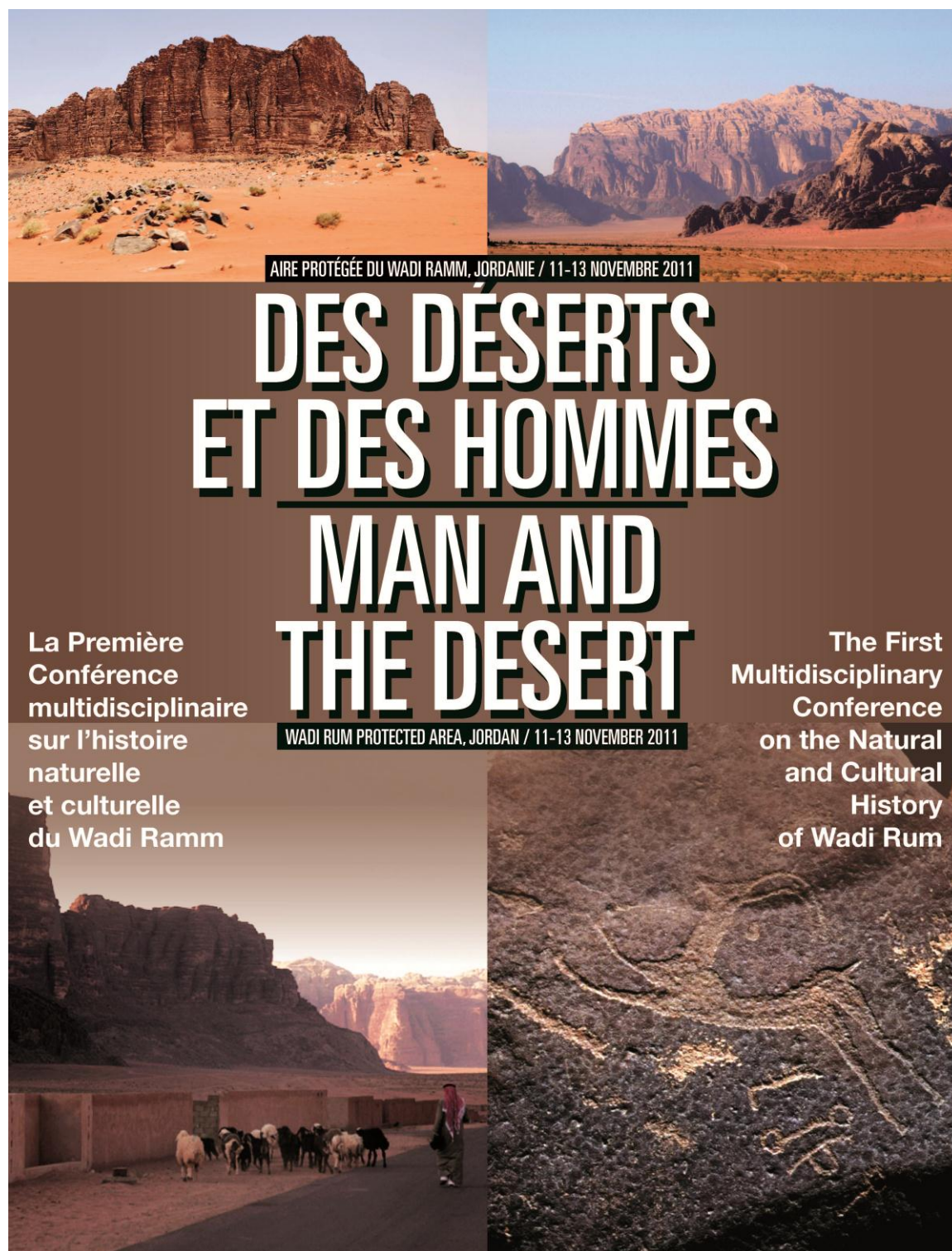
Participation was free of charge.

A. Finance details

Recettes	JOD	Outlay	JOD
Financement SCAC (8000 euros)	7 843,00 JOD	Logement	5 573,93 JOD
Financement SCAC (3000 euros) - fonds d'Alembert	2 941,00 JOD	Sacs pour les participants (avec brochure, bloc-notes, stylo,...)	1 225,00 JOD
Financement Nancy 2 (5200 euros)	5 098,04 JOD	Cadeau de remerciement organisateur	91,00 JOD
Financement GREMMO-CNRS 3900	3 823,53 JOD	Repas Restaurant « Capitaine » + pauses café	5 732,50 JOD
Financement ASEZA	16 992,43 JOD	Consommations « Beit Ali Lodge »	44,50 JOD
		Communications	881,01 JOD
		Vacations administration	3 993,00 JOD
		Réalisation affiches	600,00 JOD
		Billets d'avion	1 745,96 JOD
		Soirée spectacle bédouin	350,00 JOD
		Location bureau	300,00 JOD
		Impression brochures et badges	290,00 JOD
		Impression programme et invitations	95,00 JOD
		Transport podium et chaises	200,00 JOD
		Field Visite (3 voitures)	240,00 JOD
		Déjeuner Field Visit	1 428,43 JOD
		Assiettes - cadeau aux participants	545,00 JOD
		Billets d'avion (nombre : 11)	9 100,00 JOD
		Visas	240,00 JOD
		Nettoyage et entretien des salles	400,00 JOD
		Navettes aéroports	640,00 JOD
		Essence voitures pour déplacement des participants pour 3 jours	2 532,67 JOD
		Location voitures pour le colloque (4 jours)	450,00 JOD
TOTAL	36 698,00 JOD	TOTAL	36 698,00 JOD

4. Appendices

A. Poster



B. Conference website

The conference has a website hosted by the web platform sciencesconf.org. This is for educational and research institutions, organizers of conferences or scientific meetings.

MCWR
WADI RUM 2011

Man and the Desert
Multidisciplinary Conference in Wadi Rum
> 11-13 November 2011

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Welcome

Welcome to the site of Man and the Desert: The First Multidisciplinary Conference on the Natural and Cultural History of Wadi Rum (Jordan)
This Conference is held under the patronage of Her Royal Highness Princess Sumaya bint El Hassan, Vice Chairman of the board of trustees, Jordan Museum,
President of El Hassan Science City, President of the Royal Scientific Society
The conference will take place on 11, 12 and 13 November 2011 at the Visitor Centre of the Wadi Rum Protected Area.
This server enables you to submit a contribution to Man and the Desert: The First Multidisciplinary Conference on the Natural and Cultural History of Wadi Rum (Jordan).

Project initiator:

- Nancy University (HISCANT-MA Histoire et Cultures de l'Antiquité Grecque et Romaine et Moyen Âge).
- GREMMO-Groupe de recherche et d'étude sur la Méditerranée et le Proche-Orient (CNRS)

With the collaboration of:

- Aqaba Special Economic Zone Authority
- Cooperation and Cultural Affairs Departments of French Embassy, Amman, Jordan.

Partner institutions:

- French Institute at the Middle East (IFPO)

How to submit
In order to submit a contribution, you will need first to create an account, on the left of the screen.

Online user: 1

C. Conference programme

DES DESERTS ET DES HOMMES MAN AND THE DESERT Wadi Rum Protected Area

Under the Patronage of Her Royal Highness Princess Sumaya Bint El Hassan

Friday 11 November

09:00 – 09:30 Registration of participants

09:30 – 11:00 Introductory speeches

- Dr. Saba Farès, Associate Professor, Nancy University (HISCANT-MA EA 1132/CNRS GREMMO FRE 3412)
- H.E. Eng. Issa Ayyoub, Chief Commissioner of Aqaba Special Economic Zone Authority
- Mostafa Mihraje, deputy head of mission of French embassy in Jordan
- Her Royal Highness Princess Sumaya Bint El Hassan, Vice Chairman of the board of trustees, Jordan Museum; President of El Hassan Science City, President of Royal Scientific Society

11:00 - 11:30 Coffee break

11:30-13:00 Session 1 – The geology and geomorphology of Wadi Rum

Geology, environmental setting, and natural impacts on Petra and Wadi Rum, southern desert of Jordan

Hani Alnawafleh and Sa'ad Twaissi (Al Hussein Bin Talal University), and Thomas R. Paradise (University of Arkansas)

Fluvial and eolian forms in the region of Wadi Rum

Yann Callot, Nicolas Jacob (University of Lyon)

13:00-14:30 Lunch break

14:30-15:30 Session 2 - Rock conservation: lessons learned from Petra

Rapid base-line condition assessment of rock-cut tombs at Petra : a case study in prioritizing intervention and effective targeting of funding

Patricia Warke (Queens University), Fadi Bala'awi and Fawaz Ishakat (Hashemite University)

Architectural sandstone weathering and tourism: lessons learned from Petra

Thomas R. Paradise (University of Arkansas)

15:30-16:00 Coffee break

16:00-17:00 Session 3 - Animal ecology

Ecology and birds in Wadi Rum

Fares Khoury (American University of Madaba)

Biodiversity of mammal and reptiles in Wadi Rum

Zuhair S. Amr (Jordan University of Science and Technology)

Saturday 12 November

9:00 - 11:00

Session 1 - Prehistoric human settlements

An assemblage of pottery shards from test excavations and surveys at Wadi Rum : a preliminary report

Zeidan Kafafi (Yarmouk University)

Research at the 9,500 years old early Neolithic sites Ayn Abu Nukhayla

Donald O. Henry (University of Tulsa)

Subsistence strategies in Wadi Rum: an archaeobotanical study of the site of Hudayb al-Rih

Linda Herveux (French National Centre for Scientific Research- Archéorient UMR 5133)

Architectural, functional, and temporal variability at Tarayf al-Maragh, Wadi Rum

Gary O. Rollefson (Whitman College)

11:00 - 11:30 Coffee Break

11:30 - 13:30

Session 2 - Civilization in the desert

Pre-Islamic Wadi Rum: deities and sanctuaries

Saba Farès (Nancy University, HISCANT-MA EA 1132/CNRS GREMMO FRE 3412)

Desert deities and the men who worshipped them: the religious beliefs of the pre-Islamic Bedouin of Jordan

Cassandra Bennett (American Center of Oriental Research)

Immersed in grandeur: the eastern complex at Wadi Rum

Barbara Reeves (Queen's University), and Dennine Dudley (University of Victoria)

Water projects in the region of Wadi Rum: from ancient heritage to the current resource

Nicolas Jacob and Yann Callot (University of Lyon)

13:30 - 14:30 Lunch break

14:30 - 15:30

Session 3 - On the edge of Islamic history

Hwr of banyKhuzama

Fawzi Zayadine (former deputy director of Department of Antiquities of Jordan)

Wadi Rum in the works of Arab geographers

Abdel Aziz Al Ma'ani (King Saud University)

15:30 - 16:00

Coffee break

16:00 - 17:00

Session 4 - Society, economy and development in contemporary Wadi Rum

Society and economy in the Wadi Rum area from the early 20th century to the present

Géraldine Chatelard (independent scholar)

Developing the Wadi Rum Protected Area: environmental protection, tourism and Bedouin communities

Laura Strachan (McMaster University)

Sunday 13 November

9 : 00 - 12 : 00

Round-table discussion:

Monitoring and conserving the natural and cultural heritage of Wadi Rum :
bridging between research and policy

12:30 - 17:00

Field visit (with lunch)

D. Abstracts

Biodiversity of Mammal and Reptiles of Wadi Ramm Area

Zuhair S. Amr

Department of Biology, Jordan University of Science & Technology

Wadi Ramm area consists of precipitous, sandstone and granite mountains, which are isolated from each other by flat corridors covered with mobile sand-dunes. Such ecosystem offers a wide range of habitats for several species of reptiles and amphibians. The desert of Wadi Ramm enjoys a comparatively rich mammalian and reptilian biodiversity. A total of 34 species of reptiles representing nine families (Gekkonidae, Chamaeleonidae, Agamidae, Lacertidae, Scincidae, Varanidae, Leptotyphlopidae, Colubridae, and Viperidae) were recorded from different habitats in Wadi Ramm and its closest vicinity. Three species (*Lacertac f. kulzeri*, *Chamaeleochamaeleon*, and *Ablepharus ruppellii*) are considered to represent relicts from earlier, more humid periods. *Pristurus rupestris*, *Tropicolotes nattereri* and *Phrynocephalus arabicus* reaches their most northern range of distribution in Wadi Ramm.

Mammals are represented by at least 28 species. Bats are exemplified by eight species, while rodents have the highest species richness reach up to 13 species. Carnivores are represented by five species, most noteworthy the Afghan Fox, *Vulpes cana*, in addition to the presence of the Hyrax, *Procavia capensis*. Artiodactyls remain less known, with the confirmed presence of the Nubian Ibex. Zoogeographic affinities and conservation status for reptiles and mammals is also discussed.

Desert Deities and the men who worshipped them: the religious beliefs of the pre-Islamic Bedouin of Jordan

Cassandra Bennett

Macquarie University, Australia

The religion of the nomadic peoples of Jordan in the pre-Islamic era has long been viewed as a polytheistic grouping of pagan deities with no clearly discernible hierarchy of worship. In this paper I argue that the belief system of the nomadic desert dwellers was a henotheistic, clearly structured belief in the gods powers of providing peace and security to a warring land. Building on a corpus of inscriptions written by the Bedouin of Jordan between the 4th century A.D. and the 4th century B.C., known as Safaitic and Thamudic E, I will show how the religious attitudes towards the Arab divinities was influenced by the surrounding cultures.

Immersed in Grandeur: the Eastern Complex at Wadi Rum

Barbara Reeves

Queen's University, Kingston, Canada

Dennine Dudley

University of Victoria, Victoria, Canada

The Wadi Ramm Recovery Project (WRRP, 1996 & 1997), examined a structure we identify as the Eastern Complex located on Jebel Rum's foothill, not far from the Nabataean temple which is just up the slope to the west. The WRRP was successful in identifying and delineating the core of an elaborate structure comprised of more than 28 rooms, including a multi-chambered hypocausted bath-house which was incorporated into the larger Complex design. The results yielded by our work exceeded the initial goals and were significant in illuminating the sophistication of living conditions in ancient Wadi Rum. On the basis of the construction style and ceramics, we determined that, in origin, the structure is likely contemporary with the late 1st C - early 2nd C A.C. renovations at the temple, and suggestive of a major reconceptualization of the hill at the end of the Nabataean period. With its substantial masonry and painted plaster interiors the Eastern Complex provides evidence for luxurious living conditions in Jordan's southern desert, underpinned by advanced hydraulic technology, careful organization of public and private spaces, and elaborate social rituals. Although remote from the major centres, Wadi Rum was obviously part of the broader trade networks and cultural spheres which linked the states and societies of the ancient Near East, and our Complex is testament to the exceptional abilities of the local community to successfully adapt imported lifestyle practices to sustainable use of local resources. In recent years, archaeology and study in Jordan have yielded further comparable examples of palatial architecture and hydraulic features. Using this evidence, along with the completed ceramic, faunal and small finds analyses, we are currently preparing a concluding report for our project, to place the Eastern Complex in the broader context of the history and ecosystem of this important site. As part of this work, we are very interested in the opportunity to present our final results and to confer with other scholars concerned with the cultural and natural history of Wadi Rum. This archaeological site was once a grand structure in a (yet) spectacular setting; its tangible remains speak to the world of a rich heritage deserving of global protection and renown.

Developing the Wadi Rum Protected Area: Environmental Protection, Tourism and Bedouin Communities

Laura Strachan

McMaster University, Canada

Laura Strachan has spent the past ten years studying the Wadi Rum Protected Area. Both her MA and PhD research explored the state of development from its inception, probing the intersection of its diverse stakeholders' objectives, wants and needs. Based on a participatory-action model, her comprehensive analysis focused on dialogue with numerous stakeholders to better understand the complex issues at hand. In this presentation, Laura will address the status of four principle development decisions and/or projects that were

made to advance the protected area in its administration of environmental protection, tourism expansion and socio-economic benefits for the local Bedouin clansmen and clanswomen. She will share her findings and discuss the implications that the projects have for the development of the protected area as a whole.

Geology, Environmental Setting, and Natural Impacts on Petra and Wadi Rum, Southern Desert of Jordan

Hani Alnawafleh

Sa'ad Twaissi

Department of Archaeology, Al-Hussein Bin Talal University

Thomas Paradise

Department of Geosciences and the King Fahd Center for Middle East Studies

University of Arkansas

The world heritage sites of Petra and Wadi Rum in Jordan represent an amazing natural phenomenon that make them unique natural heritage sites in the region, and planet. In this paper the geology and environmental setting of region from Petra to Wadi Rum will be highlighted with a focus on rock formations, various geologic structure, and other aspects including biodiversity, and the unique floral and faunal of the two sites. The unusual sandstone geology of Petra and Wadi Rum makes them especially fragile sites that are exceptionally sensitive to natural and human influences. Therefore, this work will assess the impact of the natural factors (e.g. weathering, rock decay, flash flood, humidity, etc) on both sites. This research will shed new light on other factors in addition to addressing a comprehensive assessment for the negative impacts of these factors on the natural heritage of Petra and Wadi Rum and their surrounding areas and landscapes. Moreover, this paper will suggest recommendations for solving some of the threats and factors that facing the natural heritage of these UNESCO sites of Petra and Wadi Rum. Key words: Petra, Wadi Rum, Jordan, sandstone, weathering, natural threats, desert landscapes, UNESCO.

Architectural, Functional, and Temporal Variability at Tarayf al-Maragh, Wadi Rum

Gary Rollefson

Department of Anthropology, Whitman College

In 2007 and 2008, as a contribution to the joint Jordano-French Project at Wadi Ramm, more than 45 structures were identified and mapped. A sample of several structures was cleared of drift sand in order to obtain a clear indication of size, form, and orientation of the structures. It is evident that the structures served a variety of purposes (including ritual ones), and we propose that the structures range in age from the Late Prehistoric (Late Neolithic through Early Bronze Age) periods into the Nabatean period.

Ecology and Birds in Wadi Rum

Fares Khoury

Department of Biology and Biotechnology, American University of Madaba

Wadi Rum consists of high, rugged mountain blocks intersected by sand plains and wadis. Wadi Rum is characterized by its arid climate, topography and geographic location between the mountains of western Saudi Arabia, Sinai and the mountains of southwest Jordan. Year-round water availability is limited to a few little springs. Vegetation is sparse, and consists mainly of dwarf shrubs and shrubs growing on the sand plains, and along wadis. There are no endemic bird species to Wadi Rum, but the structure of the bird community is unique, and there is some similarity to the bird assemblages found along the rift margins of WadiAraba. Typical bird species include Sand and Chukar Partridge (favored game birds), Sooty Falcon, Hume's Tawny Owl, Desert Lark, Mourning, White-crowned and Hooded wheatears, Scrub Warbler, Tristram's Grackle and Pale Rose finch. Birds of prey are generally scarce and at least two species have become extinct in recent history. Many of the bird species have a black plumage, which is considered an adaptation to hot desert climates. Moreover, several species exist in relatively large numbers due to the optimal combination of cliffs (nesting) and flat plains / wadi bottoms (feeding), e.g. Sooty Falcon and Hooded wheatear.

Research at the 9.500 year old early Neolithic site of Ayn Abū Nukhayla, Wadi Rum

Donald Henry

University of Tulsa

Research at the 9,500 year old, Early Neolithic site of Ayn Abū Nukhayla, located in the Wadi Rum has produced a better understanding of the chronology, environmental setting, settlement patterns, economic practices, demographic dimensions, and social organization of the area's Middle PPNB occupations. Excavations at the site, coupled with a local geomorphic investigation, trace a short moist pulse that triggered cereal cultivation of the nearby Qa' Ram. This prompted PPNB groups to develop intensive seasonal settlements in clustered pithouse communities on the slope below the spring and to combine the farming of the Qa' with a broad land-use strategy that also included herding, foraging, and trading of ornamental shells collected from the nearby shores of the Gulf of Aqaba. The groups that seasonally occupied the site followed a pattern of transhumance in which they scheduled their movements within the area between the Gulf of Aqaba and the Ma'an Plateau based on the availability of surface water, forage, and crop cycles. Moreover, their transhumance facilitated the development of a trade network. The study also reconstructed social and economic patterns at household and community scales. The high resolution recovery of artifacts and economic evidence shows the pithouses to have been occupied by nuclear families that maintained household control of resources within largely egalitarian communities. From the perspective of regional cultural connections, research at the site points to an interaction sphere more closely tied to distant desert PPNB sites in Sinai and the Negev than to nearby PPNB sites situated on the Ma'an Plateau. Additionally, the site's

architectural and artifactual connections with the arid zone suggest that it was inhabited by desert people during a short lived moist interval rather than by PPNB groups that expanded into the desert from the more verdant Levantine Corridor.

Subsistence strategies in the Wadi Ramm : an archaeobotanical study of the site of Hudayb al-Rih

Linda Herveux

Associate researcher CNRS - Archéorient

Archaeological research carried out in the area of the Wadi Ramm provides evidence of continuous occupation since the Palaeolithic (F. Abbès, lithic studies). The discovery of the site of Hudayb al-Rih indicates occupation in the region. The unearthing of several structures opens the possibility of understanding the way of life of the habitants. Evidence from hearths allowed us to initiate a program of environmental studies in the Wadi Ramm. The goal thanks to the archaeobotanical studies is to understand past subsistence strategies. This program is associated with enthno-archaeological observations.

During the excavations at Hudayb Al-Rih samples were taken in order to carry out archaeobotanical studies. Sediment which was floated on site provided charred plant remains. With the authorization of the Department of Antiquities the samples were sent to France for analyses.

Sorting under a low powered microscope showed that no seeds were present but that the samples were rich in charred wood remains consisting mainly of olive wood but also some local species; all of which had been used as fuel. The olive is a Mediterranean species and could not have grown naturally in the region of the Wadi Ramm. Its presence on the site is evidence of either importation, or more probable in the case of wood, cultivation near the site. 14C dates made directly on the olive wood indicate an early date for this species (end of VI^e millennium av. J.C.). Indeed this is the oldest evidence for olive cultivation in the Near East.

Water projects in the region of Wadi Rum: from ancient heritage to the current resource

Nicolas Jacob

Yann Callot

Université Lyon 2

In ancient times, the region of Rum was developed through hydraulic techniques (water harnessing, water supply, dams, reservoirs). These buildings, attributed to the Nabataean culture, were used later, although little is known about the regularity of their use and the date of their final abandonment. A mission in november 2010 allowed to begin the study of one of these dams (located in the massif of Umm Daraj, south of Rum) and to describe both the bond of the dam wall and its sedimentary filling-in. The material is mainly sand, supplied by wind or water, very thinly bedded and containing charcoal in some levels. The first hypothesis of a palaeoenvironmental interpretation will be presented. The study of current intakes was conducted during two field missions, and by a survey of satellite pictures in

Google Earth®. We present a typology of water-harnessing techniques, and their spatial distribution. A first estimation of the potentially available resources is given; these data are compared to the site and cubage of the ancient tank. It allows to propose a method to identify sites for future intake and dam-building in this semi-arid region.

An Assemblage of Pottery Sherds from Test Excavations and Surveys at Wadi Rum : A Preliminary Report

Zeidan Kafafi
Yarmouk University

In 2003 Fawzi Zaydine and Saba Fares continued their archaeological excavations and surveys in the areas of WadiSabit and Hudayb el-Rih, aiming at studying the history of the Arabs before Islam in this region of Jordan. To be more clear, the directors of the project the announced the goals of their project as to investigate "the Archaeology of the nomads". To achieve the goals of the project the researches followed three main scientific approaches, as the following: 1. Registering all rock inscriptions and drawings visible in the area under study. 2. Starting a systematic archaeological survey. 3. Conducting small scale test excavations at several sites under study, such as at Hudayb el-Rih (WadiSabit). Apparently, during the test excavations and the surveys, an assemblage of pottery sherds were either excavated or collected. This paper aims at presenting a parallel study of this collection of pottery sherds. Actually, C14 (uncelebrated dates) dated to the last phase of the pottery Neolithic and the iron age II are obtained from sounded sites at Wadirum. The excavated pottery sherds excavated at WadiSalim and Hudaybar-Rih indicate that the uncovered structures were originally built during the Late Neolithic and continued to be used in the Early Bronze Ag I. However, the area under study in the Wadi Ramm seems to be heavily occupied or used by the Nabataean, Roman and Byzantine periods. In addition, the presence of the Abbasside Black Ware sherds indicate that it was still an important path for the Arab caravans passing bye, either to the north of the Arabian Peninsula, or to somewhere else.

Fluvial and Eolianforms in the region of Wadi Rum

Yann Callot
Nicolas Jacob
University of Lyon 2

The southern part of the region of Wadi Rum presents some original forms of large fans or terraces, rare in this topographic and climatic context. A field mission in May 2011 showed that these forms can be classified into two types considering their sedimentary facies and topographical position 1) mega-forms (terraces or cones) being connected to slope-deposits and sometimes dissected at their contact, 2) perched levels of lake or marsh alluvium, nested in the previous type and constituted of sandy loam deposits that locally contain remains of fauna. A morphogenic, palaeoclimatic and palaeoenvironmental interpretation, and the prospects for further researches are proposed.

Architectural Sandstone Weathering and Tourism: Lessons learned from Petra

Thomas R. Paradise

Department of Geosciences, University of Arkansas

King Fahd Center for Middle East Studies

Petra was a crucial crossroads city occupied during the Nabataean, Roman and Byzantine eras, later abandoned following its peak. Nowadays this ruined city is filled with architectural marvels carved into the sandstone cliffs and now attracts one million visitors each year. This spectacular setting is deteriorating from natural and anthropogenic factors. Comprehensive measurements of chamber humidity and surface recession were made over twenty years of research in the hopes of determining the impacts of tourism on the UNESCO World Heritage site. Petra's most celebrated tomb, al-Khazneh, the Urn Tomb, Theater, Djinn Block (#5), and the Anjar Quarry were the foci of these assessments. Since most of the remaining city's architecture was hewn, it is an ideal environmental laboratory for the study of sandstone weathering since the structures have not been moved or altered since their construction, and their lithology is relatively consistent. This study investigated intrinsic factors (i.e. climate, lithology), but more importantly examined the human influences (extrinsic) on the deterioration of these ancient sandstones and classical structures. Geologically, sandstone matrix constituents of iron and silica were found to decrease overall sandstone weatherability, while calcium matrix components were found to increase deterioration in areas that exceed 5500 megajoules/meter/year of sunlight (insolation) — a typical southern aspect in mid-latitude, arid regions such as southern Jordan. Insolation was found to have the greatest effect on weathering on southwestern and southeastern aspects indicating that insolation may be most influential in sandstone weathering, in conjunction with increased wetting-drying and/or heating-cooling cycles. Surface recession rates for sandstone were determined to range from 15 70mm per millennia on horizontal surfaces to 10 20 mm/millennia on vertical surfaces. Moreover, visitors to Petra have dramatically increased from 100,000 (1990) to 950,000 (2010), and have been found to accelerate anthropogenic weathering throughout Petra. Large (and common) tourist groups entering the chamber of Al-Khazneh were found to raise interior relative humidity levels from 20% to 50% — a possible accelerating influence on the interior sandstone walls of this tomb. It was found that interior surfaces have receded from visitor touching, rubbing, and leaning, as much as 40mm in less than 50-100 years (period of increased tourism). This indicates that a 4 by 3 meter wall area has lost a volume of sandstone of approximately one half cubic meter in these 100 years from 0.5 to 2m above the floor indicating surface recession where tourists commonly touch, lean, or rest.

Rapid base-line condition assessment of rock-cut tombs at Petra, Jordan: a case study in prioritizing intervention and effective targeting of funding

Patricia Warke

Bernard Smith

School of Geography, Archaeology & Palaeoecology, Queen's University Belfast

Fadi Bala'awi

Faswaz Ishakat

Department of Conservation Science, Queen Rania's Institute of Tourism & Heritage, The Hashemite University

Condition assessment and risk evaluation of archaeological stone structures is an essential part of any proactive heritage management plan. Those with a 'duty-of-care' for such structures not only need to know the current condition but they also need a basic understanding of the mechanisms that contribute to deterioration in order to evaluate current and future risk. This can be difficult to achieve when the number of structures that need to be maintained is large, finances are constrained and when limited numbers of staff with variable levels of expertise are available to carry out such assessments. Another issue associated with the conservation of archaeological stone is the perception that stone as a material is relatively durable especially in comparison to other materials such as wood, bone and leather which are widely recognised as being potentially fragile and are therefore proactively managed. As a result, preservation of archaeological stonework typically occurs as a reaction to clear evidence of breakdown with associated health and safety risks for the visiting public. Data from a simplified condition assessment and risk evaluation assessment scheme using a staging system approach that was initially developed and widely used by medical clinicians are reported from Petra in Southern Jordan. These data demonstrate how this information can aid in the proactive management of stone monuments in most need of remedial intervention and inform decisions regarding better targeting of funds.

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2011-11-13 14:05:27

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سفير ليتوانيا يزور غرفة تجارة الارمن

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[Congrès, colloques, réunions]
par Dominique Commelin - 28 octobre

du 11 au 13 novembre 2011
Wadi Rum (Jordanie)



Les thèmes

- The geology and geomorphology of Wadi Rum
- Rock conservation : lessons learned from Petra
- Animal ecology
- Prehistoric human settlements
- Civilization in the desert
- On the edge of Islamic history
- Society, economy and development in contemporary Wadi Rum
- Round-table discussion : Monitoring and conserving the natural and cultural heritage of Wadi Rum ; bridging between research and policy

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Des déserts et des hommes

Première conférence multidisciplinaire sur l'histoire naturelle et culturelle du Wadi Ramm

Man and the desert

The first multidisciplinary conference on the natural and cultural history of Wadi Rum

November 11-13, 2011, Wadi Rum, Jordanie

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Man and the desert. The First Multidisciplinary Conference on the Natural and Cultural History of Wadi Rum

21-23 November 2011
Wadi Rum, Jordan

The Institute of the French Near East (Ifpo) is pleased to announce the first multidisciplinary conference on the natural and cultural history of Wadi Rum, Jordan. The conference will be held from November 11-13, 2011, in Wadi Rum, Jordan. The conference is organized by the French Institute of the Near East (Ifpo) in collaboration with the Jordanian Ministry of Culture and the French Ministry of Foreign Affairs. The conference will focus on the natural and cultural history of Wadi Rum, Jordan, and will bring together experts from various disciplines to discuss the latest research in the field. The conference is open to all researchers and students interested in the natural and cultural history of Wadi Rum, Jordan. For more information, please contact the Ifpo office.

Agenda

07/12/2011 - 18:00

- Conférence :
Understanding
Authoritarianism in the
Middle East: What Can
Interpretive Political Science
Contribute? (Amman, 7
décembre 2011)

11/12/2011 - 10:30

- Table-ronde : Frontières et
circulations au Moyen-
Orient (Amman, 11
décembre 2011)

12/12/2011 - 17:00

- Séminaire doctoral : «
Terrains croisés » :
comment construire un
objet de recherche à partir
de plusieurs terrains ?
(Beyrouth, 12 décembre
2011)

15/12/2011 - 08:00

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par Dominique Commelin - 28 octobre

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Rapport

1. Présentation générale

A. Propos du colloque

Le premier colloque multidisciplinaire sur l'histoire naturelle et culturelle du Wadi Ramm a pour objet de faire un point sur les recherches menées depuis de nombreuses années, et qui sont toujours en cours. La tenue de ce colloque prend une dimension d'autant plus importante que le site a été récemment inscrit sur la liste du Patrimoine Mondial de l'UNESCO.

Le titre, « Des déserts et des hommes » est explicite. Le colloque souhaite replacer l'histoire de l'homme dans son environnement – notamment à travers l'étude de leur interaction, du poids de l'un sur l'autre – de la préhistoire à aujourd'hui.

Le colloque a pour objectif de faire le point sur les recherches dans les milieux désertiques et sur la place de l'homme dans ceux-ci, à travers la présentation des résultats de travaux menés dans différentes disciplines, relevant des sciences naturelles comme des sciences humaines et sociales.

B. Déroulement du colloque

Comité scientifique

- Madame Saba Farès, Maître de conférences, Département des sciences humaines et sociales, Université Nancy 2, France
- Madame Géraldine Chatelard, Chercheur associé, Département des études contemporaines, Institut français du Proche-Orient (Ifpo), Amman, Jordanie
- Monsieur Sawsan Fakhri, Head of the Aqaba Regional Office, Jordanian Department of Antiquities, Aqaba, Jordanie
- Monsieur Fares Khoury, Associate Professor, Department of Biological Sciences, Hashemite University, Zarqa, Jordanie
- Monsieur le Professeur Bernard Smith, School of Geography, Archaeology and Palaeoecology, Queen's University, Belfast, Irlande

Partenaires institutionnels

- Aqaba Special Economic Zone Authority (ASEZA)
- Ministère des affaires étrangères, Ambassade de France en Jordanie
- Université Nancy 2
- Université Lyon 2
- Centre National de la Recherche Scientifique (CNRS) – Groupe de recherche et d'études sur la Méditerranée et le Proche-Orient (GREMMO)
- Institut Français du Proche-Orient (IFPO)
- Institut Français en Jordanie

Le colloque a eu lieu du vendredi 11 au dimanche 13 novembre 2012 au Visitors' Centre de l'Aire protégée du Wadi Ramm. Les participants étaient logés au Beit Ali Camp.

Le colloque était placé sous le Haut Patronage de Son Altesse Royale, la Princesse Sumaya bint El Hassan, Vice-présidente du Conseil d'administration, Jordan Museum et Présidente d'El Hassan Science City, Présidente de la Royal Scientific Society.

Programme du colloque

Monsieur Salim Al-Moghrabi, Chief Commissioner for Environment and Health d'ASEZA a introduit les discours de la cérémonie d'ouverture du colloque :

- Discours de Madame Saba Farès, Maître de Conférences à l'Université Nancy 2, co-organisatrice du colloque
- Discours de Madame Maysa Shahateet de USAID/Siyaha
- Discours de Monsieur Issa Ayyoub, Chief Commissioner of Aqaba Special Economic Zone Authority
- Discours de Monsieur Mostafa Mihraje, Premier Conseiller de l'Ambassade de France en Jordanie
- Discours de Son Altesse Royale, la Princesse Sumaya bint El Hassan, Vice-présidente du Conseil d'administration, Jordan Museum et Présidente d'El Hassan Science City, Présidente de la Royal Scientific Society.

Le premier jour du colloque était consacré à l'histoire naturelle du Wadi Ramm, à la géologie et la géomorphologie, au climat et à l'étude des changements climatiques, à l'étude de l'écosystème, des espèces animales et végétales.

Lors du deuxième jour du colloque les communications étaient axées sur l'histoire culturelle du Wadi Ramm. Les questions suivantes ont été abordées :

- religion, société et économie dans l'Antiquité et aux premiers temps de l'Islam
- histoire, société, culture et économie à l'époque contemporaine
- le système de collecte des eaux pluviales de l'Antiquité jusqu'à aujourd'hui

Lors de la table ronde du troisième jour, les thèmes de la conservation et du management du patrimoine ont fait l'objet de discussions. L'après-midi était consacrée à une visite de terrain. Certains spécialistes ont présenté in-situ leurs travaux de recherches.

C. Participants

Plus de cent vingt personnes ont assisté au colloque, dont de nombreux professionnels, spécialistes des domaines abordés, parmi lesquels :

Natural sciences and environmental management :

Dr. Salim Al-Moghrabi, ASEZA Chief Commissioner for Environment and Health

Prof. Bernard Smith, Queens University, Belfast (Geomorphology)

Prof. Thomas Paradise, University of Arkansas (Geomorphology and Heritage Management)

Prof. Yann Callot, Université de Lyon (Paleo-environment)

Dr. Hani Alnawafleh, Hussein Bin Talal University (Geology and Rock Conservation)
Dr Patricia Warke, Queens University, Belfast (Physical Geography and Rock Conservation)
Dr. Fares Khoury, Hashemite University (Animal Ecology)
Dr. Linda Herveux, French National Centre for Scientific Research (Botany)
Dr. Nicolas Jacob, Université de Lyon (Geography)
Dr. Fadi Bala'awi, Hashemite University (Conservation Science)
Eng. Nash'at Hmeidan, Royal Society for the Conservation of Nature (Ecology)
Eng. Jamal Zaidaneen, Abu Dhabi Environment Agency (Wildlife Conservation)
Eng. Mahmud Bdur, USAID, former WRPA Manager (PA Management)

Human and social sciences and cultural management

Prof. Abdel Aziz Al-Mani', King Saud University (History)
Prof. Zeidan Kafafi, Yarmouk University (Prehistory)
Prof. Donald O. Henry, University of Tulsa (Anthropology)
Dr. Saba Fares, Université de Nancy (History and North Arabian Epigraphy)
Dr. Zeyad Salameen, Al-Hussein Bin Talal University (Islamic Epigraphy and Archaeology)
Dr. Sawsan Fakhri, Department of Antiquities (Archaeology)
Dr. Dennine Dudley, University of Victoria (Archaeology)
Dr. Barbara Reeves, Queen's University (Archaeology)
Dr. Géraldine Chatelard, Institut français du Proche-Orient (History and Social Anthropology)
Ms. Laura Strachan, Ph.D. candidate, University of British Columbia (Social Anthropology)

2. Bilan scientifique

A. Objectifs du colloque

Le Wadi Ramm, dans le sud de la Jordanie a récemment été inscrite au titre de patrimoine naturel et patrimoine culturel sur la liste du Patrimoine Mondial de l'UNESCO. Si l'inscription au Patrimoine Mondial du site n'est pas l'objet du colloque, l'organisation de celui-ci s'inscrit dans la volonté de valoriser les richesses du Wadi Ramm, à travers la présentation des recherches menées par des spécialistes du monde entier – et ce depuis de nombreuses années – sur l'histoire naturelle et culturelle de la région.

Pourquoi un colloque multidisciplinaire sur le Wadi Ramm ?

- le Wadi Ramm a une histoire naturelle et culturelle millénaire très riche. Si les beautés naturelles du site attirent des centaines de milliers de touristes, le patrimoine historique et naturel de celui-ci est méconnu.
- les connaissances scientifiques actuelles sur la région ne sont pas facilement disponibles pour les personnes qui mettent en œuvre ou participent à la mise en œuvre la politique de gestion du site.
- la réunion des spécialistes de la région ainsi que la diffusion des recherches sont essentiels afin de fournir des conseils techniques et de guider les autorités dans la surveillance de la conservation du patrimoine naturel et culturel du site.

L'objectif du colloque est également de mettre en place une stratégie pour l'avenir de la recherche sur le Wadi Ramm, ainsi que de proposer des recommandations aux autorités compétentes en matière de management et de surveillance du patrimoine naturel et culturel, dans le contexte du développement du tourisme.

B. Résumé du colloque

Sciences naturelles

Le Wadi Ramm est l'un des paysages de sable les plus célèbres du monde. Les roches modelées par les intempéries et par l'histoire tectonique et structurale de la zone lui donnent son image si particulière. Intempéries et histoire tectonique et structurale en ont fait un « laboratoire naturel » dans lequel certains des problèmes clés de la géomorphologie du désert peuvent être explorés. Les questions de l'évolution du paysage, de la nature de l'érosion des éléments verticaux (falaises), sont posées. Le rôle de l'infiltration des eaux souterraines dans ce processus ouvre la voie à une exploration de la façon dont les conditions climatiques ont pu influencer celle-ci et ont abouti à la formation de grottes et de cavernes. Ces endroits créés par les infiltrations naturelles ont toujours été importants pour l'habitat humain. La compréhension des processus géomorphologiques a donc un intérêt dans les études archéologiques. Dans un cadre plus large, cette compréhension du processus est nécessaire pour la conservation future des paysages, tant en termes d'identification des aires d'un intérêt scientifique particulier que des zones les plus sensibles aux changements et qui méritent une protection renforcée et souvent spécifique. La compréhension de la géomorphologie du Wadi Ramm est primordiale pour une approche réussie de l'écosystème et pour la conservation de l'environnement. Elle est également essentielle pour le développement durable de la région. Le colloque aborde des champs d'études divers, tels que géologie, géomorphologie passé et présente, climatologie, botanique, écologie, conservation et gestion du patrimoine naturel.

Sciences humaines et sociales

Le relief exceptionnel du Wadi Ramm a joué un rôle essentiel dans la sédentarisation de populations dans la région et dans le développement d'activités et de techniques sophistiquées. Couvrant près de 12 000 ans, le Wadi Ramm abrite l'une des plus riches collections d'art rupestre et d'épigraphie au monde. Constituant une riche documentation, gravures et inscriptions permettent de comprendre la relation entre les modes de vies sédentaires et nomades sur une période extrêmement longue. Les facteurs sous-tendant cette relation ont été la combinaison de contraintes environnementales et de forces sociales, économiques et politiques, à la fois extérieures et intérieures. A la Préhistoire, les débuts de la sédentarisation ont été favorisés par un climat plus humide, alimentant abondamment les sources. L'étude de la richesse en ressources naturelles et de l'utilisation de celles-ci montre l'adaptabilité des communautés aux climats. En effet, bien que le climat se soit asséché à l'Âge du bronze, les hommes se sont maintenus dans la région. Les gravures documentent la présence ou la disparition de certaines espèces animales, sauvages ou domestiquées, en réponse aux changements climatiques. Des restes archéologiques témoignent de cycles d'activités agricoles (culture des olives, domestication et élevages de divers animaux,...)

organisés à partir de systèmes sophistiqués de collecte des eaux pluviales (barrages, canaux, réservoirs, citernes,...).

Les études épigraphiques et archéologiques récentes permettent d'actualiser et de préciser les connaissances sur le Wadi Ramm en tant que centre religieux et commercial de l'Arabie du Nord à l'époque pré-islamique. Elles permettent aussi d'identifier le site comme étant l'« Iram » mentionné dans le Coran. Ces recherches sont également importantes dans l'étude de l'histoire de l'écriture dans la péninsule arabique. Les connaissances sur le Wadi Ramm bénéficient de recherches archéologiques précédemment menées dans le bassin d'Hisma et la région de Maan. Ces dernières permettent de comprendre le site dans un environnement plus large, et de combler le manque de connaissances que nous avons sur le Wadi Ramm à l'époque Islamique classique et à l'époque Ottomane.

Actuellement, la région du Wadi Ramm vit du tourisme et, dans une moindre mesure, du pastoralisme, deux activités complémentaires pour les populations bédouines locales. De grands projets agricoles ont également été mis en œuvre vers Disah. Les nouveaux usages faits du site, et plus particulièrement l'accroissement du nombre de visiteurs, les opportunités économiques actuelles, mais aussi les défis sociaux, culturels et environnementaux, doivent être appréhendés à travers une gestion adéquate et soucieuse de la préservation de l'environnement.

C. Bilan et perspectives

La place n'est pas ici au bilan scientifique des communications, chacune d'entre-elles constituant déjà un bilan de plusieurs années de recherches. Il convient ici de montrer les bénéfices de la réunion « in-situ » de scientifiques, chercheurs et universitaires ainsi que l'apport de la diffusion de leurs recherches auprès des communautés et pouvoirs locaux.

La table ronde de la matinée du dernier jour du colloque a été l'occasion de faire ensemble le bilan et de réfléchir aux possibles formes de collaborations entre le monde scientifique, les pouvoirs publics et les populations locales. Les principaux points abordés et les premières conclusions tirées de ces discussions, sont les suivants :

- Nécessité d'élargir la zone protégée du Wadi Ramm aux zones tampon.
- Nécessité de répertorier l'intégralité des sites d'intérêt naturel et culturel afin d'en dresser un inventaire.
- Proposition de création de bases de données afin de partager le savoir, la connaissance et le produit des recherches sur le Wadi Ramm.
- Proposition de créer un centre de recherche sur le Wadi Ramm qui serait lieu de valorisation des travaux scientifiques, lieux d'accueil des acteurs de la valorisation du site.
- Nécessité de communiquer sur les richesses du site à travers des publications grands publics (brochures, guides de visite,...) et d'une carte répertoriant les principaux sites. Toutefois, avec la localisation des « richesses » Wadi Ramm, le risque de la dégradation par l'homme est soulevé. Des mesures de protection devront y remédier.

- Faire prendre conscience de l'importance du patrimoine du Wadi Ramm et montrer les retombées positives de l'inscription au Patrimoine Mondial de l'UNESCO en prenant des exemples d'autres sites aux quatre coins du monde.
- Importance de la création d'un lieu de sensibilisation, d'éducation à la conservation et à la protection du patrimoine naturel et culturel et d'un musée ou d'un espace d'interprétation afin de diffuser les connaissances sur le site, son histoire et son patrimoine naturel et culturel, au public le plus large.
- Importance d'établir une stratégie de sauvegarde, protection, conservation du patrimoine ; de le protéger des dégradations naturelles et surtout humaines.
- Proposer des recommandations aux autorités compétentes en matière de management et de surveillance du patrimoine naturel et culturel ; rôle de fournir des conseils techniques et de guider les autorités dans les mesures à mettre en place.
- Importance de la formation du personnel des équipes, de la sensibilisation et de l'éducation des populations locales et des acteurs du tourisme.

Ce colloque a mis l'accent sur l'importance de faire un point régulièrement sur les recherches scientifiques menées dans le Wadi Ramm et de publier les actes de colloques, ainsi que sur l'importance d'une coopération étroite avec les autorités locales dans la mise en place de programmes de développement, valorisation et protection du site.

3. Bilan financier

A. Sources de financement

Le colloque a bénéficié du soutien financier d'Aqaba Special Economic Zone Authority (ASEZA), gestionnaire de l'aire protégée du Wadi Ramm, à hauteur de 16 992,43 JOD, du Service de Coopération et d'Action Culturelle de l'Ambassade de France à Amman, à hauteur de 8 000€ et 3 000€, ainsi que de l'Université Nancy II (5200€) et du GREMMO-CNRS (3900€).

La participation au colloque était gratuite.

A. Détail des finances

Recettes	JOD	Dépenses	JOD
Financement SCAC (8 000€)	7 843,00 JOD	Logement	5 573,93 JOD
Financement SCAC (3 000 €) - fonds d'Alembert	2 941,00 JOD	Sacs pour les participants (avec brochure, bloc-notes, stylo,...)	1 225,00 JOD
Financement Nancy 2 (5 200 €)	5 098,04 JOD	Cadeau de remerciement organisateur	91,00 JOD
Financement GREMMO-CNRS (3900€)	3 823,53 JOD	Repas Restaurant « Capitaine » + pauses café	5 732,50 JOD
Financement ASEZA	16 992,43 JOD	Consommations « Beit Ali Lodge »	44,50 JOD
		Communications	881,01 JOD
		Vacations administration	3 993,00 JOD
		Réalisation affiches	600,00 JOD
		Billets d'avion	1 745,96 JOD
		Soirée spectacle bédouin	350,00 JOD
		Location bureau	300,00 JOD
		Impression brochures et badges	290,00 JOD
		Impression programme et invitations	95,00 JOD
		Transport podium et chaises	200,00 JOD
		Field Visite (3 voitures)	240,00 JOD
		Déjeuner Field Visit	1 428,43 JOD
		Assiettes - cadeau aux participants	545,00 JOD
		Billets d'avion (nombre : 11)	9 100,00 JOD
		Visas	240,00 JOD
		Nettoyage et entretien des salles	400,00 JOD
		Navettes aéroports	640,00 JOD
		Essence voitures pour déplacement des participants pour 3 jours	2 532,67 JOD
		Location voitures pour le colloque (4 jours)	450,00 JOD
TOTAL	36 698,00 JOD	TOTAL	36 698,00 JOD

4. Annexes

A. Affiche

AIRE PROTÉGÉE DU WADI RAMM, JORDANIE / 11-13 NOVEMBRE 2011

DES DÉSERTS ET DES HOMMES MAN AND THE DESERT

La Première
Conférence
multidisciplinaire
sur l'histoire
naturelle
et culturelle
du Wadi Ramm

WADI RUM PROTECTED AREA, JORDAN / 11-13 NOVEMBER 2011

The First
Multidisciplinary
Conference
on the Natural
and Cultural
History
of Wadi Rum



B. Site Internet du colloque

Le colloque s'est doté d'un site Internet hébergé par la plate-forme web sciencesconf.org. Celle-ci s'adresse aux établissements de l'enseignement et de la recherche organisateurs de colloques ou de réunions scientifiques.

MCWR **Man and the Desert** > 11-13 November 2011
Multidisciplinary Conference in Wadi Rum
WADI RUM 2011

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Welcome to the site of **Man and the Desert: The First Multidisciplinary Conference on the Natural and Cultural History of Wadi Rum (Jordan)**

This Conference is held under the patronage of Her Royal Highness Princess Sumaya bint El Hassan, Vice Chairman of the board of trustees, Jordan Museum,

President of El Hassan Science City, President of the Royal Scientific Society

The conference will take place on 11, 12 and 13 November 2011 at the Visitor Centre of the Wadi Rum Protected Area.

This server enables you to submit a contribution to **Man and the Desert: The First Multidisciplinary Conference on the Natural and Cultural History of Wadi Rum (Jordan)**.

Project initiator:

- Nancy University (HISCANT-MA Histoire et Cultures de l'Antiquité Grecque et Romaine et Moyen Âge).
- GREMMO-Groupe de recherche et d'étude sur la Méditerranée et le Proche-Orient (CNRS)

With the collaboration of:

- Aqaba Special Economic Zone Authority
- Cooperation and Cultural Affairs Departments of French Embassy, Amman, Jordan.

Partner institutions:

- French Institute at the Middle East (IFPO)

How to submit
In order to submit a contribution, you will need first to create an account, on the left of the screen.

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C. Programme du colloque

DES DESERTS ET DES HOMMES **MAN AND THE DESERT** **Wadi Rum Protected Area**

Under the Patronage of Her Royal Highness Princess Sumaya Bint El Hassan
Friday 11 November

09:00 – 09:30 Registration of participants

09:30 – 11:00 Introductory speeches

- Dr. Saba Farès, Associate Professor, Nancy University (HISCANT-MA EA 1132/CNRS GREMMO FRE 3412)
- H.E. Eng. Issa Ayyoub, Chief Commissioner of Aqaba Special Economic Zone Authority
- Mostafa Mihraje, deputy head of mission of French embassy in Jordan
- Her Royal Highness Princess Sumaya Bint El Hassan, Vice Chairman of the board of trustees, Jordan Museum; President of El Hassan Science City, President of Royal Scientific Society

11:00 - 11:30 Coffee break

11:30-13:00 **Session 1 – The geology and geomorphology of Wadi Rum**

Geology, environmental setting, and natural impacts on Petra and Wadi Rum, southern desert of Jordan

Hani Alnawafleh and Sa'ad Twaissi (Al Hussein Bin Talal University), and Thomas R. Paradise (University of Arkansas)

Fluvial and eolian forms in the region of Wadi Rum

Yann Callot, Nicolas Jacob (University of Lyon)

13:00-14:30 Lunch break

14:30-15:30 **Session 2 - Rock conservation: lessons learned from Petra**

Rapid base-line condition assessment of rock-cut tombs at Petra: a case study in prioritizing intervention and effective targeting of funding

Patricia Warke (Queens University), Fadi Bala'awi and Fawaz Ishakat (Hashemite University)

Architectural sandstone weathering and tourism: lessons learned from Petra

Thomas R. Paradise (University of Arkansas)

15:30-16:00 Coffee break

16:00-17:00

Session 3 - Animal ecology

Ecology and birds in Wadi Rum

Fares Khoury (American University of Madaba)

Biodiversity of mammal and reptiles in Wadi Rum

Zuhair S. Amr (Jordan University of Science and Technology)

Saturday 12 November

9:00 - 11:00

Session 1 - Prehistoric human settlements

An assemblage of pottery shards from test excavations and surveys at Wadi Rum : a preliminary report

Zeidan Kafafi (Yarmouk University)

Research at the 9,500 years old early Neolithic sites Ayn Abu Nukhayla

Donald O. Henry (University of Tulsa)

Subsistence strategies in Wadi Rum: an archaeobotanical study of the site of Hudayb al-Rih

Linda Herveux (French National Centre for Scientific Research- Archéorient UMR 5133)

Architectural, functional, and temporal variability at Tarayf al-Maragh, Wadi Rum

Gary O. Rollefson (Whitman College)

11:00 - 11:30 Coffee Break

11:30 - 13:30

Session 2 - Civilization in the desert

Pre-Islamic Wadi Rum: deities and sanctuaries

Saba Farès (Nancy University, HISCANT-MA EA 1132/CNRS GREMMO FRE 3412)

Desert deities and the men who worshipped them: the religious beliefs of the pre-Islamic Bedouin of Jordan

Cassandra Bennett (American Center of Oriental Research)

Immersed in grandeur: the eastern complex at Wadi Rum

Barbara Reeves (Queen's University), and Dennine Dudley (University of Victoria)

Water projects in the region of Wadi Rum: from ancient heritage to the current resource

Nicolas Jacob and Yann Callot (University of Lyon)

13:30 - 14:30 Lunch break

14:30 - 15:30

Session 3 - On the edge of Islamic history

Hwr of banyKhuzama

Fawzi Zayadine (former deputy director of Department of Antiquities of Jordan)

Wadi Rum in the works of Arab geographers

Abdel Aziz Al Ma'ani (King Saud University)

15:30 - 16:00

Coffee break

16:00 - 17:00

Session 4 - Society, economy and development in contemporary Wadi Rum

Society and economy in the Wadi Rum area from the early 20th century to the present

Géraldine Chatelard (independent scholar)

Developing the Wadi Rum Protected Area: environmental protection, tourism and Bedouin communities

Laura Strachan (McMaster University)

Sunday 13 November

9 : 00 - 12 : 00

Round-table discussion:

Monitoring and conserving the natural and cultural heritage of Wadi Rum :
bridging between research and policy

12:30 - 17:00

Field visit (with lunch)

D. Résumés des communications

Biodiversity of Mammal and Reptiles of Wadi Ramm Area

Zuhair S. Amr

Department of Biology, Jordan University of Science & Technology

Wadi Ramm area consists of precipitous, sandstone and granite mountains, which are isolated from each other by flat corridors covered with mobile sand-dunes. Such ecosystem offers a wide range of habitats for several species of reptiles and amphibians. The desert of Wadi Ramm enjoys a comparatively rich mammalian and reptilian biodiversity. A total of 34 species of reptiles representing nine families (Gekkonidae, Chamaeleonidae, Agamidae, Lacertidae, Scincidae, Varanidae, Leptotyphlopidae, Colubridae, and Viperidae) were recorded from different habitats in Wadi Ramm and its closest vicinity. Three species (*Lacertac f. kulzeri*, *Chamaeleochamaeleon*, and *Ablepharus rueppellii*) are considered to represent relicts from earlier, more humid periods. *Pristurus rupestris*, *Tropicolotes nattereri* and *Phrynocephalus arabicus* reaches their most northern range of distribution in Wadi Ramm.

Mammals are represented by at least 28 species. Bats are exemplified by eight species, while rodents have the highest species richness reach up to 13 species. Carnivores are represented by five species, most noteworthy the Afghan Fox, *Vulpes cana*, in addition to the presence of the Hyrax, *Procavia capensis*. Artiodactyls remain less known, with the confirmed presence of the Nubian Ibex. Zoogeographic affinities and conservation status for reptiles and mammals is also discussed.

Desert Deities and the men who worshipped them: the religious beliefs of the pre-Islamic Bedouin of Jordan

Cassandra Bennett

Macquarie University, Australia

The religion of the nomadic peoples of Jordan in the pre-Islamic era has long been viewed as a polytheistic grouping of pagan deities with no clearly discernible hierarchy of worship. In this paper I argue that the belief system of the nomadic desert dwellers was a henotheistic, clearly structured belief in the gods powers of providing peace and security to a warring land. Building on a corpus of inscriptions written by the Bedouin of Jordan between the 4th century A.D. and the 4th century B.C., known as Safaitic and Thamudic E, I will show how the religious attitudes towards the Arab divinities was influenced by the surrounding cultures.

\$Immersed in Grandeur: the Eastern Complex at Wadi Rum

Barbara Reeves

Queen's University, Kingston, Canada

Dennine Dudley

University of Victoria, Victoria, Canada

The Wadi Ramm Recovery Project (WRRP, 1996 & 1997), examined a structure we identify as the Eastern Complex located on Jebel Rum's foothill, not far from the Nabataean temple which is just up the slope to the west. The WRRP was successful in identifying and delineating the core of an elaborate structure comprised of more than 28 rooms, including a multi-chambered hypocausted bath-house which was incorporated into the larger Complex design. The results yielded by our work exceeded the initial goals and were significant in illuminating the sophistication of living conditions in ancient Wadi Rum. On the basis of the construction style and ceramics, we determined that, in origin, the structure is likely contemporary with the late 1st C - early 2nd C A.C. renovations at the temple, and suggestive of a major reconceptualization of the hill at the end of the Nabataean period. With its substantial masonry and painted plaster interiors the Eastern Complex provides evidence for luxurious living conditions in Jordan's southern desert, underpinned by advanced hydraulic technology, careful organization of public and private spaces, and elaborate social rituals. Although remote from the major centres, Wadi Rum was obviously part of the broader trade networks and cultural spheres which linked the states and societies of the ancient Near East, and our Complex is testament to the exceptional abilities of the local community to successfully adapt imported lifestyle practices to sustainable use of local resources. In recent years, archaeology and study in Jordan have yielded further comparable examples of palatial architecture and hydraulic features. Using this evidence, along with the completed ceramic, faunal and small finds analyses, we are currently preparing a concluding report for our project, to place the Eastern Complex in the broader context of the history and ecosystem of this important site. As part of this work, we are very interested in the opportunity to present our final results and to confer with other scholars concerned with the cultural and natural history of Wadi Rum. This archaeological site was once a grand structure in a (yet) spectacular setting; its tangible remains speak to the world of a rich heritage deserving of global protection and renown.

Developing the Wadi Rum Protected Area: Environmental Protection, Tourism and Bedouin Communities

Laura Strachan

McMaster University, Canada

Laura Strachan has spent the past ten years studying the Wadi Rum Protected Area. Both her MA and PhD research explored the state of development from its inception, probing the intersection of its diverse stakeholders' objectives, wants and needs. Based on a participatory-action model, her comprehensive analysis focused on dialogue with numerous

stakeholders to better understand the complex issues at hand. In this presentation, Laura will address the status of four principle development decisions and/or projects that were made to advance the protected area in its administration of environmental protection, tourism expansion and socio-economic benefits for the local Bedouin clansmen and clanswomen. She will share her findings and discuss the implications that the projects have for the development of the protected area as a whole.

Geology, Environmental Setting, and Natural Impacts on Petra and Wadi Rum, Southern Desert of Jordan

Hani Alnawafleh

Sa'ad Twaissi

Department of Archaeology, Al-Hussein Bin Talal University

Thomas Paradise

Department of Geosciences and the King Fahd Center for Middle East Studies

University of Arkansas

The world heritage sites of Petra and Wadi Rum in Jordan represent an amazing natural phenomenon that make them unique natural heritage sites in the region, and planet. In this paper the geology and environmental setting of region from Petra to Wadi Rum will be highlighted with a focus on rock formations, various geologic structure, and other aspects including biodiversity, and the unique floral and faunal of the two sites. The unusual sandstone geology of Petra and Wadi Rum makes them especially fragile sites that are exceptionally sensitive to natural and human influences. Therefore, this work will assess the impact of the natural factors (e.g. weathering, rock decay, flash flood, humidity, etc) on both sites. This research will shed new light on other factors in addition to addressing a comprehensive assessment for the negative impacts of these factors on the natural heritage of Petra and Wadi Rum and their surrounding areas and landscapes. Moreover, this paper will suggest recommendations for solving some of the threats and factors that facing the natural heritage of these UNESCO sites of Petra and Wadi Rum. Key words: Petra, Wadi Rum, Jordan, sandstone, weathering, natural threats, desert landscapes, UNESCO.

Architectural, Functional, and Temporal Variability at Tarayf al-Maragh, Wadi Rum

Gary Rollefson

Department of Anthropology, Whitman College

In 2007 and 2008, as a contribution to the joint Jordano-French Project at Wadi Ramm, more than 45 structures were identified and mapped. A sample of several structures was cleared of drift sand in order to obtain a clear indication of size, form, and orientation of the structures. It is evident that the structures served a variety of purposes (including ritual ones), and we propose that the structures range in age from the Late Prehistoric (Late Neolithic through Early Bronze Age) periods into the Nabatean period.

Ecology and Birds in Wadi Rum

Fares Khoury

Department of Biology and Biotechnology, American University of Madaba

Wadi Rum consists of high, rugged mountain blocks intersected by sand plains and wadis. Wadi Rum is characterized by its arid climate, topography and geographic location between the mountains of western Saudi Arabia, Sinai and the mountains of southwest Jordan. Year-round water availability is limited to a few little springs. Vegetation is sparse, and consists mainly of dwarf shrubs and shrubs growing on the sand plains, and along wadis. There are no endemic bird species to Wadi Rum, but the structure of the bird community is unique, and there is some similarity to the bird assemblages found along the rift margins of WadiAraba. Typical bird species include Sand and Chukar Partridge (favored game birds), Sooty Falcon, Hume's Tawny Owl, Desert Lark, Mourning, White-crowned and Hooded wheatears, Scrub Warbler, Tristram's Grackle and Pale Rose finch. Birds of prey are generally scarce and at least two species have become extinct in recent history. Many of the bird species have a black plumage, which is considered an adaptation to hot desert climates. Moreover, several species exist in relatively large numbers due to the optimal combination of cliffs (nesting) and flat plains / wadi bottoms (feeding), e.g. Sooty Falcon and Hooded wheatear.

Research at the 9.500 year old early Neolithic site of Ayn Abū Nukhayla, Wadi Rum

Donald Henry

University of Tulsa

Research at the 9,500 year old, Early Neolithic site of Ayn Abū Nukhayla, located in the Wadi Rum has produced a better understanding of the chronology, environmental setting, settlement patterns, economic practices, demographic dimensions, and social organization of the area's Middle PPNB occupations. Excavations at the site, coupled with a local geomorphic investigation, trace a short moist pulse that triggered cereal cultivation of the nearby Qa' Ram. This prompted PPNB groups to develop intensive seasonal settlements in clustered pithouse communities on the slope below the spring and to combine the farming of the Qa' with a broad land-use strategy that also included herding, foraging, and trading of ornamental shells collected from the nearby shores of the Gulf of Aqaba. The groups that seasonally occupied the site followed a pattern of transhumance in which they scheduled their movements within the area between the Gulf of Aqaba and the Ma'an Plateau based on the availability of surface water, forage, and crop cycles. Moreover, their transhumance facilitated the development of a trade network. The study also reconstructed social and economic patterns at household and community scales. The high resolution recovery of artifacts and economic evidence shows the pithouses to have been occupied by nuclear families that maintained household control of resources within largely egalitarian communities. From the perspective of regional cultural connections, research at the site points to an interaction sphere more closely tied to distant desert PPNB sites in Sinai and the Negev than to nearby PPNB sites situated on the Ma'an Plateau. Additionally, the site's

architectural and artifactual connections with the arid zone suggest that it was inhabited by desert people during a short lived moist interval rather than by PPNB groups that expanded into the desert from the more verdant Levantine Corridor.

Subsistence strategies in the Wadi Ramm : an archaeobotanical study of the site of Hudayb al-Rih

Linda Herveux

Associate researcher CNRS - Archéorient

Archaeological research carried out in the area of the Wadi Ramm provides evidence of continuous occupation since the Palaeolithic (F. Abbès, lithic studies). The discovery of the site of Hudayb al-Rih indicates occupation in the region. The unearthing of several structures opens the possibility of understanding the way of life of the habitants. Evidence from hearths allowed us to initiate a program of environmental studies in the Wadi Ramm. The goal thanks to the archaeobotanical studies is to understand past subsistence strategies. This program is associated with enthno-archaeological observations.

During the excavations at Hudayb Al-Rih samples were taken in order to carry out archaeobotanical studies. Sediment which was floated on site provided charred plant remains. With the authorization of the Department of Antiquities the samples were sent to France for analyses.

Sorting under a low powered microscope showed that no seeds were present but that the samples were rich in charred wood remains consisting mainly of olive wood but also some local species; all of which had been used as fuel. The olive is a Mediterranean species and could not have grown naturally in the region of the Wadi Ramm. Its presence on the site is evidence of either importation, or more probable in the case of wood, cultivation near the site. 14C dates made directly on the olive wood indicate an early date for this species (end of VI^e millennium av. J.C.). Indeed this is the oldest evidence for olive cultivation in the Near East.

Water projects in the region of Wadi Rum: from ancient heritage to the current resource

Nicolas Jacob

Yann Callot

Université Lyon 2

In ancient times, the region of Rum was developed through hydraulic techniques (water harnessing, water supply, dams, reservoirs). These buildings, attributed to the Nabataean culture, were used later, although little is known about the regularity of their use and the date of their final abandonment. A mission in november 2010 allowed to begin the study of one of these dams (located in the massif of Umm Daraj, south of Rum) and to describe both the bond of the dam wall and its sedimentary filling-in. The material is mainly sand, supplied by wind or water, very thinly bedded and containing charcoal in some levels. The first hypothesis of a palaeoenvironmental interpretation will be presented. The study of current

intakes was conducted during two field missions, and by a survey of satellite pictures in Google Earth®. We present a typology of water-harnessing techniques, and their spatial distribution. A first estimation of the potentially available resources is given; these data are compared to the site and cubage of the ancient tank. It allows to propose a method to identify sites for future intake and dam-building in this semi-arid region.

An Assemblage of Pottery Sherds from Test Excavations and Surveys at Wadi Rum : A Preliminary Report

Zeidan Kafafi
Yarmouk University

In 2003 FawziZaydin and Saba Fares continued their archaeological excavations and surveys in the areas of WadiSabit and Hudayb el-Rih, aiming at studying the history of the Arabs before Islam in this region of Jordan. To be more clear, the directors of the project the announced the goals of their project as to investigate "the Archaeology of the nomads". To achieve the goals of the project the researches followed three main scientific approaches, as the following: 1. Registering all rock inscriptions and drawings visible in the area under study. 2. Starting a systematic archaeological survey. 3. Conducting small scale test excavations at several sites under study, such as at Hudayb el-Rih (WadiSabit). Apparently, during the test excavations and the surveys, an assemblage of pottery sherds were either excavated or collected. This paper aims at presenting a parallel study of this collection of pottery sherds. Actually, C14 (uncelebrated dates) dated to the last phase of the pottery Neolithic and the iron age II are obtained from sounded sites at Wadirum. The excavated pottery sherds excavated at WadiSalim and Hudaybar-Rih indicate that the uncovered structures were originally built during the Late Neolithic and continued to be used in the Early Bronze Ag I. However, the area under study in the Wadi Ramm seems to be heavily occupied or used by the Nabataean, Roman and Byzantine periods. In addition, the presence of the Abbasside Black Ware sherds indicate that it was still an important path for the Arab caravans passing bye, either to the north of the Arabian Peninsula, or to somewhere else.

Fluvial and Eolianforms in the region of Wadi Rum

Yann Callot
Nicolas Jacob
University of Lyon 2

The southern part of the region of Wadi Rum presents some original forms of large fans or terraces, rare in this topographic and climatic context. A field mission in May 2011 showed that these forms can be classified into two types considering their sedimentary facies and topographical position 1) mega-forms (terraces or cones) being connected to slope-deposits and sometimes dissected at their contact, 2) perched levels of lake or marsh alluvium, nested in the previous type and constituted of sandy loam deposits that locally contain remains of fauna. A morphogenic, palaeoclimatic and palaeoenvironmental interpretation, and the prospects for further researches are proposed.

Architectural Sandstone Weathering and Tourism: Lessons learned from Petra

Thomas R. Paradise

Department of Geosciences, University of Arkansas

King Fahd Center for Middle East Studies

Petra was a crucial crossroads city occupied during the Nabataean, Roman and Byzantine eras, later abandoned following its peak. Nowadays this ruined city is filled with architectural marvels carved into the sandstone cliffs and now attracts one million visitors each year. This spectacular setting is deteriorating from natural and anthropogenic factors. Comprehensive measurements of chamber humidity and surface recession were made over twenty years of research in the hopes of determining the impacts of tourism on the UNESCO World Heritage site. Petra's most celebrated tomb, al-Khazneh, the Urn Tomb, Theater, Djinn Block (#5), and the Anjar Quarry were the foci of these assessments. Since most of the remaining city's architecture was hewn, it is an ideal environmental laboratory for the study of sandstone weathering since the structures have not been moved or altered since their construction, and their lithology is relatively consistent. This study investigated intrinsic factors (i.e. climate, lithology), but more importantly examined the human influences (extrinsic) on the deterioration of these ancient sandstones and classical structures. Geologically, sandstone matrix constituents of iron and silica were found to decrease overall sandstone weatherability, while calcium matrix components were found to increase deterioration in areas that exceed 5500 megajoules/meter/year of sunlight (insolation) — a typical southern aspect in mid-latitude, arid regions such as southern Jordan. Insolation was found to have the greatest effect on weathering on southwestern and southeastern aspects indicating that insolation may be most influential in sandstone weathering, in conjunction with increased wetting-drying and/or heating-cooling cycles. Surface recession rates for sandstone were determined to range from 15 70mm per millennia on horizontal surfaces to 10 20 mm/millennia on vertical surfaces. Moreover, visitors to Petra have dramatically increased from 100,000 (1990) to 950,000 (2010), and have been found to accelerate anthropogenic weathering throughout Petra. Large (and common) tourist groups entering the chamber of Al-Khazneh were found to raise interior relative humidity levels from 20% to 50% — a possible accelerating influence on the interior sandstone walls of this tomb. It was found that interior surfaces have receded from visitor touching, rubbing, and leaning, as much as 40mm in less than 50-100 years (period of increased tourism). This indicates that a 4 by 3 meter wall area has lost a volume of sandstone of approximately one half cubic meter in these 100 years from 0.5 to 2m above the floor indicating surface recession where tourists commonly touch, lean, or rest.

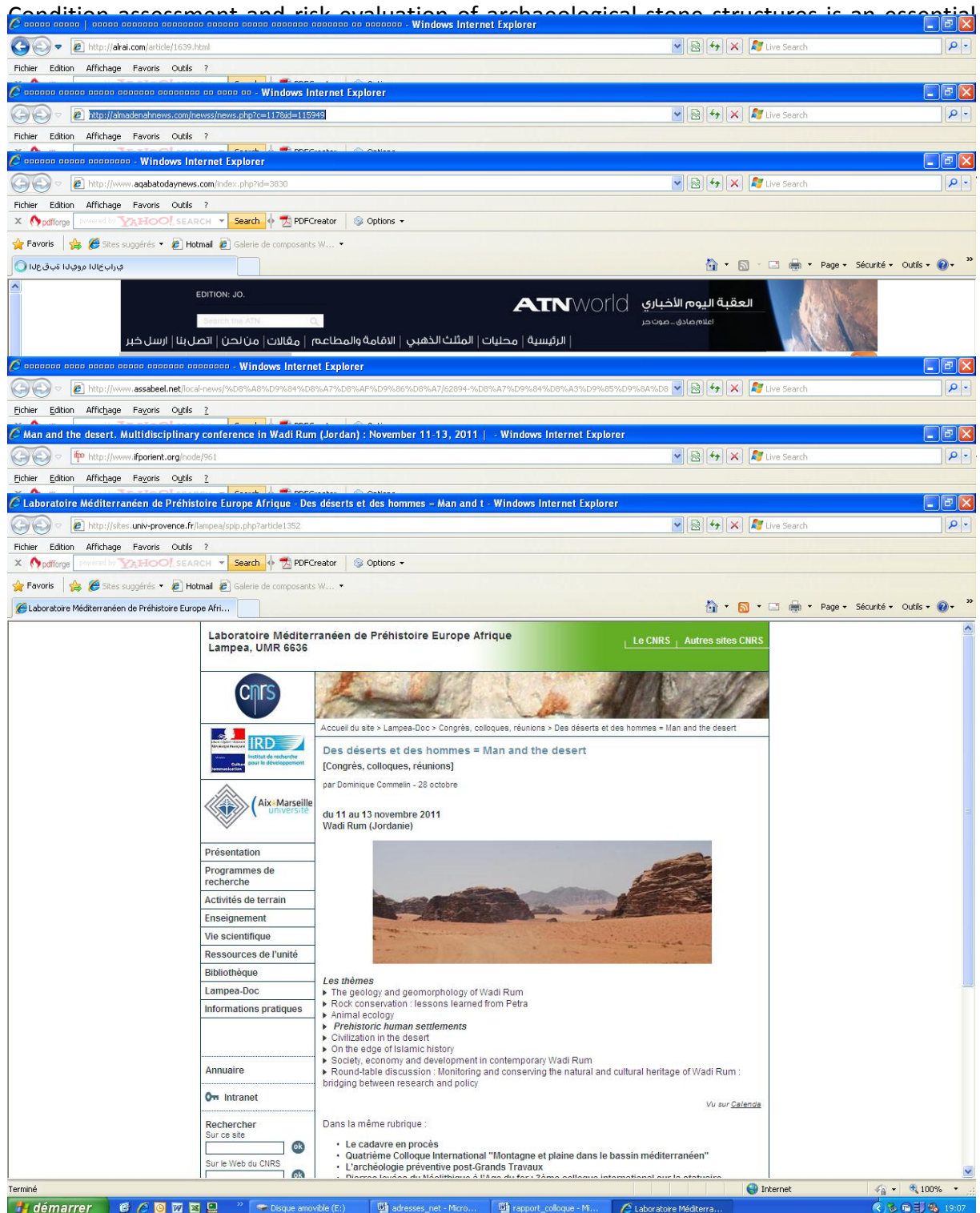
Rapid base-line condition assessment of rock-cut tombs at Petra, Jordan: a case study in prioritizing intervention and effective targeting of funding

Patricia Warke

Bernard Smith

School of Geography, Archaeology & Palaeoecology, Queen's University Belfast

Fadi Bala'awi
Faswaz Ishakat
Department of Conservation Science, Queen Rania's Institute of Tourism & Heritage, The
Hashemite University



<http://www.youtube.com/watch?v=UbyW-SJ0gyg>