

International Conference on Hydrology of the Large River Basins of Africa

Hammamet, Tunisia, October, 26-30th, 2015

Scientific report

Context

The international conference on the hydrology of large river basins of Africa was held in Hammamet from 26 to 30 October 2015.

She was placed under the supervision of UNESCO, as part of his FRIEND. The FRIEND-Water program (découlement Regimes from International Experimental and Network Data) aims to energize, for over 25 years, the regional communities hydrologists experts, and generate new knowledge on regional hydrology and the multi-scale water cycle process. FRIEND-Water studying long-term changes and changes in hydrological variables to better understand the effects of climate, environment and human activities on the spatial and temporal distributions of water. Scientific projects and training supported by the FRIEND-Water program are essential for: the management of water resources, socio-economic developments, environmental protection and assessment of global change impacts, including those related climate change and human activities. Transversal program of the International Hydrological Programme (IHP) of UNESCO, FRIEND-Water contributes to research on: the regional water resources, drought, global change and the water cycle, as well as education and strengthening capacity. The full FRIEND-Water program and interacts with many national projects and international initiatives. Facilitators FRIEND programs covering Africa (Nile, Western and Central Africa, Southern Africa and Mediterranean) were asked to scientific monitoring of programming and summaries. MEDFRIEND The program has been particularly requested for the organization, and has posted summaries and articles of the <http://armspark.msem.univ-montp2.fr/medfriend/index.asp?menu=hammamet> conference.

UNESCO provided a significant financial support from Paris and Nairobi (headquarters of the regional office for Sub-Saharan Africa).

Other sponsors of the conference are:

- Agence Universitaire de la Francophonie, which has provided financial support through the National Agronomic Institute of Tunis (INAT) and the University of Carthage,
- IRD has provided financial support through its Information and Communication Department,
- The International Association of Hydrological Sciences, which has ensured the dissemination of information on the conference without royalties,
- Have supported the conference by disseminating information in their networks:
 - ° the UNESCO International Chair on integrated management of rivers based in Vienna, Austria,
 - ° the Maghreb PHC program "Water and Climate" (Rouen, Constantine, Marrakech, Tunis)
 - ° the Congo Basin HYDRONET network Kinshasa, DR Congo
 - ° UNESCO International Sediment Initiative

- the Engineering Laboratory of Water and Environment of the National School hydraulics of Blida, Algeria,
- the International Institute of Engineering of Water and Environment (2iE) of Ouagadougou, Burkina Faso,
- MAGHLAG the network of lagoons Maghreb.

Finally, INRGREF (National Research Institute of Rural Engineering of Waters and Forests of Tunisia), the National Agronomic Institute of Tunisia (INAT), the Laboratory HydroSciences Montpellier, the Montpellier Institute of Water and Environment (IM2E) and the Scientific and Technical Association for Water and Environment, Tunisia (ASTEE) have mobilized their human, technical and financial resources to the practical realization of the conference.

All these partners and associates colleagues are gratefully acknowledged for their help and support.

Scientific Objectives

Because of their large area and their central role in their resources and activities of countries, large river basins are major socio-economic objects. Increasing population and water demand, the increase in global mean temperature and other climatic changes, modify the rainfall-runoff relationship of local to continental scale, and modify the availability and drinkability some water. Furthermore, all human activities have an impact on rainfall-discharge relations and runoff regimes: agricultural, dams and other waterworks, roads and urbanization, forest management, soil conservation practices, for example. Thus the current standards for the design of hydraulic structures are outdated and must be updated. But in Africa, most of the major river basins are poorly monitored and managed. Water resources have been exploited for a long time, without regard to the sustainability of water resources and water quality in ecosystems and their management does not sufficiently take into account the preservation of the natural balance along the river from its source to the coastal areas. The increase in urban areas increases the risk of local flash floods, insufficiently drained by undersized infrastructure. The dramatic reduction in the sea sediment flow has a direct impact on the instability of the coast and the regression of the shoreline, but also changes the balance of coastal ecosystems. The regulation of flows reduced wetlands and associated ecosystems. Faced with societal and environmental challenges related to water resources of large rivers, in a socio-economic climate and changing environment, it is important to analyze the resources available and their possible evolution. However, in many countries the hydrological networks have not saved data for decades, and in many others the number of permanent gauging stations is very low and does not cover the entire country. Precipitation and other climate data are often difficult to access, which prevents researchers to work with accurate data, even in their own country. Some of the necessary data can be replaced with thankfully international databases, but most of them are usually made with only a small part of a measured existing data, and little recent data. The sediment flow and water quality are never followed, with the exception of a very small number of stations that are part of international observatories.

In this context, it is urgent to re-develop the major watersheds and observatories, to monitor their activity and better model how changes in hydrology have affected the environment, with final impacts on societies and socio activities economic. This conference is an opportunity to exchange work experiences in many countries in Africa, and several international bodies basin. It is under the aegis of several international programs and institutions that aim to better sharing of knowledge and data, increasing the number of permanent observatories for large river basins, greater international cooperation, especially in shared river basins, and to improve cooperation between development agencies, national and international operators and the research sector.

Conference themes

The conference themes are from the most studied topics by 4 FRIEND groups which cover Africa and are supervised by regional coordinators and theme of these programs.



1. Global change, climatology and hydrological regimes (Mohamed Meddi-Algérie)
2. Erosion, sediment transport and water quality (Gaston Lienou†-Cameroun et Ernest Amoussou-Bénin)
3. Coastal ecohydrology and land-sea integrated management (Maria Snoussi-Maroc et Oula Amrouni-Tunisie)
4. Low flows and surface/groundwater relationships, karstic hydrogeology (Bamory Kamagate-Côte d'Ivoire)
5. Extreme events (Ennio Ferrari-Italie et Christophe Bouvier-France)
6. Databases and observatories (Jean François Boyer-France et Gil Mahé-France)
7. Hydrlogical modelling and water resources scenarios (Denis Hughes-Afrique du Sud)
8. Relationships between man and environnement and impact on water resources and socio-economic activities (Raphael Tshimanga-RDCongo)

Result of the conference

The conference hosted in Tunisia 154 researchers from 27 countries, mostly in Africa and Europe but also in South America and Asia. In addition to the 59 participants from Tunisia, including the Minister of Agriculture and two counselors for the opening ceremony, reflecting the great interest that Tunisia attaches to this research topic, the conference attracted 47 researchers Maghreb and Eastern Mediterranean, 30 sub-Saharan African and 16 European researchers. It should be noted that the organization of the conference paid no airline ticket to the participants, all the supporters were directed to assistance to cover the participation fee. This shows the commitment of the participants who mobilize their own resources to reach the event, demonstrating their keen interest in the activities and meetings planned.

Nearly 220 abstracts were received, and over 200 were accepted, but more than 70 researchers have not managed to find a way to finance their coming, even in cases where a support grant for registration fees the conference was certified two months in advance. Some European countries, or universities, unfortunately banned the movement in Tunisia, despite the establishment of a logistics adapted and secured around the conference, with the participation of security officials from the hotel and region, since all the participants who came by plane were welcomed and supported by bus or private car at the airport and escorted identically. Altogether 128 papers were presented, including 100 oral form and 28 as posters. The availability of three different sizes of rooms allowed to hold parallel sessions and has offered to as many oratorical rostrum increasingly popular with participants because often requested for a chance to get national support. Long coffee breaks enabled posters and fruitful exchange sessions. The most represented themes concern the global change and the erosion and sediment transport; themes on groundwater, hydrological modeling and human relationships / Environment have also received many abstracts, while the topics on coastal ecohydrology, databases and extreme events have had less success in number (Table below).

Thème	1	2	3	4	5	6	7	8	Plénière	Total
Oral	17	20	9	11	7	5	14	11	6	100
Poster	7	6	0	4	1	3	3	4		28
Total	24	26	9	15	8	8	17	15	6	128

The two days ended with two parallel workshops.

The first was a joint meeting of the steering committees of four FRIEND groups represented at the conference: NILE, AOC, MED and SOUTHERN AFRICA, whose goal was to collect proposals to guide future



activities of UNESCO FRIEND program . It brought together around twenty researchers. The second workshop was attended by nearly 40 researchers at the initiative of UNESCO working group on the establishment of a hydrological standards revision project in Africa. This was the third meeting of this project, started in 2013. The discussions extended to the whole continent have made progress in defining the contours of the outline and expected project, which will shortly produce a "white paper" that as a basis for negotiations with donors under the aegis of UNESCO. The next meeting is to take place in the spring Abidjan with ECOWAS for technical and financial discussions, which will be preceded by an expert workshop.

Opening of the conference

The conference was opened by an audience of seven personalities:

Mr. Saad SEDDIK Ministry of Agriculture of Tunisia

Mr. Elyes HAMZA CEO of the National Agronomic Institute of Tunisia, organizing body

Mr. Hamadi Habaieb Director General of the National Institute of Rural Engineering of Waters and Forests Research, organizing body and Chairman of the Scientific Committee

Mr. Taoufik Hermassi Maitre assistant at the National Research Institute of Rural Engineering of Waters and Forests, Chairman of the Local Organising Committee

Mrs Souhaila ALOUI MANAI Representative of the Agence Universitaire de la Francophonie, donor organization

Mr. Abou AMANI Representative of UNESCO, donor agency and the conference framework

Mr. Henny van LANEN Chairman of Inter-Committee FRIEND Groups

Mr. Gil MAHE IRD representative, donor organization and organizing body.

Invited conferences

The event gave the podium to 6 guest speakers.

10h30-11h00 Conférence invitée : Henny Van Lanen (Pays Bas/Président du Comité intergroupes FRIEND) : **Les programmes FRIEND, 25 ans de réussite et de collaborations internationales.**

11h00-11h30 Conférence invitée : Ameur Horchani (Tunisie, ex secrétaire d'Etat à l'hydraulique) : **L'hydrologie dans les aménagements hydrauliques de la Tunisie.**

11h30-12h00-Conférence invitée : Tanor Meissa Dieng (Sénégal/Assistant technique SITWA/RAOB) **L'enjeu des ressources en eau sur les grands fleuves africains au 21^{ème} siècle.**

12h00-12h30 Conférence invitée : Abou Amani (Kenya/Hydrologue régional Afrique Sub-saharienne de l'UNESCO) : **La révision des normes hydrologiques en Afrique : un programme d'appui aux projets d'aménagements futurs.**

8h30-9h00 Conférence invitée : Luc Sigha (RDCongo/Expert hydrologue pour la CICOS – Commission Internationale du bassin du Congo-Oubangui-Sangha) : **La fédération des efforts de recherche et de développement autour des ressources en eau du fleuve Congo.**

9h00-9h30 Conférence invitée : Christophe Brachet (France-OIEAU/Adjoint au Directeur Général) : **Applications de l'information hydrologique dans les grands bassins transfrontaliers africains.**

Note that these speakers were not subsidized, they chose to participate in the conference and we thank them. Their presentations were of great interest to all participants and have opened the debate for the sessions that followed. The first lecture was given by Henny van LANEN Committee Chair Inter Groups FRIEND, FRIEND who presented the program of UNESCO, which he spent the chair Gil MAHE after his presentation. The second conference was given by Ameur HORCHANI, former Secretary of State for Water Resources of Tunisia, who presented the evolution of Hydrological Sciences and various scientific and technical approaches for decades in Tunisia. Tanor Dieng then presented the activities of the African

Network of Basin Organizations (ANBO), regional version of the International Network of Basin Organizations. ANBO is based in the OMVS (Organization for the Development of the Senegal River) in Dakar, Senegal. It represents the basin management organizations, national or international, which for many years synchronize their activities and exchange on the issues of water resources management, particularly border. Abou Amani, hydrologist at the UNESCO Nairobi Regional Office, presented the draft revision of hydrological standards in Africa due to climate change, he supported for several years. Luc Sigha presented the development projects on the Congo River, through the activities of CICOS, International Commission of the Congo Oubangui Sangha, one of the flagship projects is the construction of a canal waters of the Congo to the Chari return power to Lake Chad. The invited talks were concluded by the presentation of Christopher BRACHET, deputy director of the International Office for Water, based in Paris, focused on the need to exchange and share hydrological information between countries that share watersheds of international watercourses, with a particular focus on West Africa, rivers Niger, Volta and Senegal in particular.

Thematic sessions

The detailed program is attached to this report.

Below is presented a summary of the different sessions that were organized.

All abstracts and fifty articles are available on the conference website given above.

Thematic scientific results.

1. Global change, climatology and hydrological regimes

This theme covers the study of time series of hydroclimatic parameters such as rainfall, Morocco, Algeria, South Africa, with possible teleconnections; floods in Algeria, Senegal -Y-he has a resumption of flows -; evapotranspiration of a forest in the Maghreb and water balance in Tunisia, water stress in Senegal; stationarity, trends, ruptures, North Africa and Central Africa; their links with major climate signals and global change, in the Sahel, in Turkey; the evaluation of hydroclimatic risk in Benin, but also the techniques and methods used for the statistical study of these series, segmentation Senegal, wavelets on the Congo Basin.

2. Erosion, sediment transport and water quality

Erosion is a constant threat to the agricultural potential. It is rarely measured and many methods have been developed to estimate. The partition between what settles on the continent and what happens at sea is poorly known, nor the impact on coastal areas -complex river-lagoon in Benin. This requires the monitoring of siltation of dams -Jordan, Tunisia-but the quantification of sediment transport along water courses -Examples in Algeria. GIS are very useful for these approaches and modeling -Medjerda Tunisia Oued Mina and Wahrane Oued in Algeria. Water quality is also a frequently discussed research problem, whether to explore the potential use of -Tunisia waters; gold panning in Burkina Faso; spring waters in Rwanda; Algeria-nitrate or for remediation -Tunisia. Climate change also has major impacts on the environment, vegetation and surface processes, it is not possible today to separate what in environmental degradation comes from the direct actions of the man or of global change -Oued Algeria-Abd, and it is increasingly necessary to study the sedimentary archives for understanding current developments - Tunisia. Finally the methods of conservation of water and soil, long studied are still actual themes - Mediterranean strategy.

3. Ecohydrology and land-sea integrated management

Ecohydrology is a science that uses multidisciplinary approaches, which often connects the physical environment, quality measures and risk concepts. It is very often linked to the study of the impact of human activities on the environment. The focus on coastal areas is that sea level rise african- -Example of the West coast, coupled with the decline in continental sediment supply to the coast -Golfe Algeria-Arzew, already causing growing instability of the line coast and often accelerated withdrawal of -Cases shore gulfs of Tunis and Hammamet. Coastal wetlands are also subject to a double pressure withdrawal

"natural" from the shore, and mechanical activities and human pollution -Language prickly in Senegal; Ouémé in Benin; Medjerda in Tunisia, which is the object modeling -Fleuve Bandama Cote d'Ivoire.

4. Low flows and surface/groundwater relationships, karstic hydrogeology

This theme includes several research topics associated with groundwater that are studied in several regions FRIEND. Groundwater is often studied to estimate their quality or by salinization geochemistry and isotope geochemistry -Oued Nile in Algeria; slick Sminja in Tunisia; tablecloth Haouz in Morocco; Nile system in Eastern Sahara-, or their suitability for irrigation -Oued Rmal Tunisia. Karst aquifers, particularly developed around the Mediterranean are important water resources and poorly identified, they are the subject of numerous investigations -Aquifère Zaghouan in Tunisia; Tlemcen in Algeria. Climate changes also impact groundwater -Batna in Algeria, and their relationships with -Bani surface water in Mali; Siliana / Medjerda in Tunisia and drought indices. GIS and hydrodynamic modeling are two tools frequently used to study groundwater and predicting their availability for the integrated management of water resources - Wilaya Djelfa in Algeria; plain of Souss-Massa in Morocco. Finally the traditional hydraulic systems are still studied, especially in very dry areas, such as Tassili n'Ajjer in the Algerian south.

5. Extreme events

Extreme events of rain or flow are devastating and are the subject of extensive research for a long time, in terms of -Algérois classification; Mekkeria in Algeria; Medjerda in Tunisia, simulation and prediction, that involve developments in mathematics and statistics -Networks applied to neurons algérois- coastal basins, and also a good knowledge of the environment to make correlations. The application of environmental degradation, such as loss of land on the Ouémé basin in Benin, is a practical application. The extreme temperatures are also studied, because they increase the demand for water in the basins and negatively contribute to -Cases water balance of Morocco. Finally, the extreme flood regimes and their spread are also the subject of specific studies, often referred -Fleuve Nzi practice facilities in Côte d'Ivoire; Hodna Basin in Algeria.

6. Databases and observatories

The presentations highlighted the importance of observatories and data sharing: there are a few large bases easily accessible international data: GRDC in Koblenz in Germany, SIEREM website for large pools of Africa, and others. Note the increasing importance of data from remote sensing / radar altimeter for the series construction of water heights of virtual stations. A very recent result in Burkina Faso on the use of mitigation telephone signals to derive information on precipitation intensity and precipitated height.

7. Hydrological modelling and water resources scenarios

The theme of the hydrological modeling is often studied in the FRIEND regional programs, often in the form of application models in particular contexts -Grands African basins and conceptual models, application of SWAT in Morocco, using the model to the Cameroon-Growa, but new models or methods are increasingly tested as fractals -Oued Algeria-Isser; neural networks; the concept of entropy and intelligent hybrid systems in the Sahara. These models are calibrated and validated on past periods and are used to simulate future water resources -High Niger at Koulikoro in Mali; Examples in Algeria; Manantali dam in Mali in 2015. They also serve as flood prediction tool, as the case of Medjerda downstream of the dam Sidi Salem.

8. Relationships between man and environnement and impact on water resources and socio-economic activities

This theme opens on connections between human activities and their impact on the environment and water resources. This is a very broad theme, in which subjects often involve the mobilization of water for agriculture and irrigation and their impact on the environment and quality of water -Plaine Haouz and Bouregreg in Morocco ; with prospects for future resources, Timgad in Algeria; Volta basin in West Africa.



There is also talk of development and multipurpose resource management -Bassin Sassandra in Côte d'Ivoire; Lake Victoria Basin in Uganda; Ogooué Gabon-basin, and crisis and conflict management -Bassin Nile in Egypt; Mascara in Algeria. These relationships can also affect groundwater resources -Aquifère Grombalia in Tunisia, -Fisheries and living resources in the Lake Chad. Finally, endogenous knowledge are increasingly studied to better understand the evolution process, as if the region Torri in Benin.

Conclusions

The conference had several objectives:

- Bring together researchers from all parts of Africa, as well as researchers working in North Africa.

In this regard the conference was a great success for 30 sub-Saharan African researchers participated in the event, all traveling on their own resources, which clearly indicates the great interest of the sub-Saharan African research community to this problem of large basins river in Africa, and their willingness to meet colleagues from other parts of Africa.

- Bring together researchers and representatives of international organizations.

On this plane also the conference was a success, because many large organizations were present: International Office for Water (Paris, France), African Network of Basin Organizations (Dakar, Senegal), Down Organization of the Senegal River (Dakar, Senegal), Oubangui Sangha International Commission Congo (Kinshasa, DR Congo), hydrological regional office of UNESCO in Nairobi (Kenya), UNESCO Chair in Water Resources (246), the Omdurman Islamic University of Khartoum (Sudan), the NGO "The Nature Conservancy" Gabon, for safeguarding ecosystems of Ogooué River and coordinators FRIEND 3 major programs in Africa: West and Central Africa (Université d'Abobo-Adjamé, Abidjan, Côte Ivory), Southern Africa (University Grahamstown, South Africa) and Mediterranean (Montpellier, France)

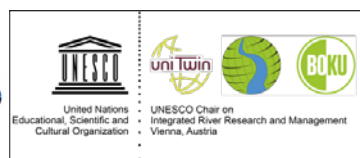
- To present recent results in many areas related to major river basins.

With nearly 130 presentations covering all Africa conference has enabled the diffusion of recent results in many areas related to large watersheds. The topics related to hydrological extremes, observatories and databases and coastal ecohydrology gathered under presenters, but allowed the diffusion of results sometimes quite innovative (eg the relationship between telephone signals and intensity of rainfall) . Yet these issues are very important in an integrated development perspective of transboundary water resources and respectful of ecosystems, we must ensure that they are well publicized for future meetings, or presented in a more attractive way. To develop these themes, it is for example already discussing the organization of the second joint workshop between AOC and FRIEND MEDFRIEND on Hydrological Extremes, the Nangui Abrogoua University of Abidjan in Ivory Coast in the spring 2016, in parallel with the organization of a technical meeting of the draft revision of hydrological standards of UNESCO in Abidjan with technical and financial partners.

- Generate an African international movement for the study of large rivers.

The excellent trade that developed with colleagues from all parts of Africa helped to forge strong links between communities. As such, the closing ceremony allowed the colleagues at the University Cheikh Anta Diop of Dakar in Senegal to announce their bid to host the second international conference on hydrology major basins in Africa in Dakar in autumn 2016, with the support of the FRIEND AOC group and the UNESCO FIGCC. The first information about the event will be known before the end of 2015. The choice of 2016 has established taking into account the time constraints, since 2017 is already rich in international water events: IAHS conference Port

Elizabeth in South Africa, and third international conference on the great rivers of the world (which sponsored the conference Hammamet) in Europe. The presence of many national and international organizations of al conference basins helped develop exchanges between technical and scientific partners, including NGOs.



ANNEX

Programme détaillé final de la conférence



CONFERENCE INTERNATIONALE FRIEND/UNESCO/PROGRAMME HYDROLOGIQUE INTERNATIONAL
 SUR L'HYDROLOGIE DES GRANDS BASSINS AFRICAINS
 HAMMAMET, TUNISIE 26-30 OCTOBRE 2015

PROGRAMME DETAILLE FINAL

SALLE DE GALA
 GRANDE SALLE
 PETITE SALLE

LUNDI 26 OCTOBRE

Arrivée des participants. Accueil à l'aéroport et transfert par navettes de bus vers la ville d'Hammamet, distante de 60 km (1 heure de trajet).
 Ouverture de l'enregistrement à l'hôtel.

MARDI 27 OCTOBRE

7h30-8h45 Enregistrement.

8h45-10h00 Cérémonie d'Ouverture, présidée par le Ministre de l'Agriculture, des Ressources Hydrauliques et de la Pêche de Tunisie, Directeurs de l'INRGREF et de l'INAT, Représentants de l'UNESCO/programme FRIEND, de l'AUF et de l'IRD.

10h00-10h30 Pause café

Session Plénière **Chair : Hamadi Habaieb-Tunisie, Denis Hughes – Afrique du Sud et Luc Sigha-Cameroun**

10h30-11h00 Conférence invitée : **Henny Van Lanen** (Pays Bas/Président du Comité intergroupes FRIEND) : **Les programmes FRIEND, 25 ans de réussite et de collaborations internationales.**

11h00-11h30 Conférence invitée : **Ameur Horchani** (Tunisie, ex secrétaire d'Etat à l'hydraulique) : **L'hydrologie dans les aménagements hydrauliques de la Tunisie.**

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12h00-12h30 Conférence invitée : **Abou Amani** (Kenya/Hydrologue régional Afrique Sub-saharienne de l'UNESCO) : **La révision des normes hydrologiques en Afrique : un programme d'appui aux projets d'aménagements futurs.**

12h30-14h00 Repas

14h00-16h00 **Thèmes parallèles 1 – 2 – 3**

Thème 1 : Changement global, climatologie et régimes hydrologiques (Mohamed Meddi-Algérie et Abderazek Souissi - Tunisie)

14h00	ZAMRANE	Zineb	Maroc	Relation entre la variabilité climatique et les fluctuations du climat à l'échelle des grands bassins versant du Maroc (bassins Moulouya, Sebou et Tensift)
14h20	TALIA	Amel	Algérie	Etude des crues d'oued Seggueur (Sud-Ouest algérien)
14h40	TAIBI	Sabrina	Algérie	Change in seasonal rainfall of northern Algeria
15h00	SAMBOU	Soussou	Sénégal	Analyse des tendances dans les séries hydrométéorologiques dans le bassin supérieur du fleuve Sénégal : vers une reprise des écoulements ?
15h20				

Thème 2 : Erosion, transport sédimentaire et qualité des eaux (Hamma Yacouba – Burkina-Faso et Abdallah Chrid - Tunisie)



14h00				
14h20	RAZANAMAH ANDRY	Lovasoia Christine	Burkina-Faso	Etat des lieux sur la bioremédiation du cyanure dans les eaux et les sols contaminés
14h40	OUILLOIN	Sylvain	Viêt Nam	Effets du changement climatique sur le régime hydrologique et le transport particulaire de l'Oued Abd, Algérie (1970-2010)
15h00	NSIRI	Ines	Tunisie	The monitoring of the surface water quality: Joumine, Sejnane, Mellegue and Masri
15h20	BOUGHATTAS	Nour El Houta	Tunisie	Modeling water erosion at macro scale : Nebhana watershed (Central Tunisia)

Thème 3 : Eco-hydrologie côtière et gestion intégrée terre-mer (Ernest Amoussou – Bénin et Hsan Chourabi - Tunisie)

14h00				
14h20	KOUASSI	Kouakou Lazare	Côte d'Ivoire	Numerical simulation of the hydrodynamic functioning of the mouth of Bandama River, Côte d'Ivoire
14h40	HZAMI	Abderraouf	Tunisie	Suivi par SIG et télédétection de l'évolution spatio-temporelle de la frange littorale Nabeul-Hergla (Golfe de Hammamet, Tunisie)
15h00	HELALI	Amine	Tunisie	Composition géochimique et distribution spatiale et saisonnière de la matière en suspension au large du delta de l'Oued Mejerda (Golfe de Tunis)
15h20	DESCROIX	Luc	Sénégal	Les conséquences environnementales de l'élévation du niveau océanique sur les zones littorales ouest-africaines

16h00-16h30 Pause café et posters thèmes 1, 2 & 3

16h30-18h30 Thèmes parallèles 1 – 2 – 3

Thème 1 : Changement global, climatologie et régimes hydrologiques (Hafzullah Aksoy – Turquie et Zouheir Nasr - Tunisie)

16h30	NASR	Zouheir	Tunisie	Anomalie d'évapotranspiration d'une forêt de quercus suber L. dans un contexte de changement climatique
16h50	KOUDAMILORO	Olivier	Benin	Etudes des risques hydroclimatiques dans le bassin versant du fleuve Ouémé à Bétérou au Bénin (Afrique de l'Ouest)
17h10	HUBERT	Pierre	France	Segmentation des séries de débits moyens annuels de grands fleuves africains
17h30	FNIGUIRE	Fatima	Maroc	Evolution du régime pluviométrique sous variabilité climatique en domaine méditerranéen aride. L'exemple du bassin versant de Tensift (Maroc central)
17h50	FAYE	Cheikh	Sénégal	Une évaluation comparative des séquences du stress hydrique et de la sécheresse par indicateurs et par échelles de temps dans le bassin du Bafing en amont de Manantali

Thème 2 : Erosion, transport sédimentaire et qualité des eaux (Faiza Hallouz – Algérie et Slah Nasri - Tunisie)

16h30	LOUAMRI	Abdelaziz	Algérie	Variabilité amont-aval et temporelle des transports solides en suspension dans le bassin versant de la Seybouse (Nord-Est algérien)
16h50	KOTTI	Fatma	Tunisie	Reconstruction de la variabilité passée des transports sédimentaires du bassin versant de la Medjerda, Tunisie
17h10	KONZI PANISE SIAMO	Edouard	RD Congo	L'Erosion, le Transport des sédiments et la Qualité de l'Eau
17h30	KHANCHOUH	Kamel	Algérie	Assessing sediment yield in the Kebir catchment, northeast of Algeria
17h50	KAROUI	Hela	Burkina Faso	Risques environnementaux et sanitaires sur les sites d'orpillage au Burkina Faso : cycle de vie des principaux polluants et perception des orpailleurs

Thème 3 : Eco-hydrologie côtière et gestion intégrée terre-mer (Kouakou Lazare Kouassi - Côte d'Ivoire et Oula Amrouni - Tunisie)

16h30	AMROUNI	Oula	Tunisie	Etude morphodynamique saisonnière de la plage microtidale de Medjerda. Baie ouest du Golfe de Tunis, Tunisie (Mer Méditerranée)
16h50	AMOUSSOU	Ernest	Benin	Péjoration climatique et dynamique hydroécologique dans le bassin-versant du fleuve Ouémé au Bénin
17h10	AMAR	Youssef	Algérie	Impact des apports terrigènes sur la texture sédimentaire et biodiversité benthique du golfe d'Arzew.
17h30	BENMOUSSA	Thouraya	Tunisie	Morphodynamique des barres sableuses inter-littorales dans des conditions de

				tempête (Cas de la Cellule Kaâlat Andalous –Medjerda, Golfe de Tunis)
17h50	SY	Amadou Abou	Sénégal	Quantification des dynamiques hydrosédimentaires (2010-2015) liées à l'évolution d'une brèche ouverte sur la Langue de Barbarie

MERCREDI 28 OCTOBRE

Session Plénière **Chair : Henny van Lanen – Pays Bas et Abou Amani – Kenya**

8h30-9h00 Conférence invitée : **Luc Sigha** (RD Congo/Expert hydrologue pour la CICOS – Commission Internationale du bassin du Congo-Oubangui-Sangha) : **La fédération des efforts de recherche et de développement autour des ressources en eau du fleuve Congo.**

9h00-9h30 Conférence invitée : **Christophe Brachet** (OIEAU/Adjoint au Directeur Général – France) : **Applications de l'information hydrologique dans les grands bassins transfrontaliers africains.**

9h30-10h30 Thèmes parallèles 1 – 2 – 8

Thème 1 : **Changement global, climatologie et régimes hydrologiques (Cyriaque Rufin Nguimalet – République Centrafricaine et Sihem Ben Abdallah - Tunisie)**

9h30	DESCROIX	Luc	France	Les grands cours d'eau exogènes du Sahel, entre Cappus et Horton...
9h50	BENABDELLAH	Sihem	Tunisie	SWAT hydrological model parameter identification on the BANI catchment (West Africa) under limited data condition
10h10	AKSOY	Hafzullah	Turkey	Hydrological description of Mediterranean watersheds in Turkey

Thème 2 : **Erosion, transport sédimentaire et qualité des eaux (Kamel Khanchoul – Algérie et Taoufik Hermassi - Tunisie)**

9h30	IYAKARE	Jean de Dieu	Rwanda	Origine, qualité chimique et vulnérabilité des eaux de sources et des eaux minérales commercialisées au Rwanda
9h50	HERMASSI	Taoufik	Tunisie	Modélisation de l'érosion hydrique au niveau du bassin versant de la Medjerda
10h10	HALLOUZ	Faiza	Algérie	Modelling of quality of natural waters case of the dam of Sidi M'Hamed Ben Aouda in the watershed of the Wadi Mina (Northwest Algeria)

Thème 8 : **Relations homme-environnement et impact sur les ressources en eau et les activités socio-économiques (Expedit Vissin – Bénin et Gil Mahé - France)**

9h30	VISSIN	Expedit Wilfrid	Benin	Caractérisation hydroclimatique et savoirs endogènes en pays Torri dans la commune de Akpro-Misserete
9h50	SEFIANI	Salma	Maroc	Evaluation et gestion de la qualité des eaux d'irrigation au niveau du site agricole Agafay, Haouz occidental, Maroc
10h10	ATHAMENA	Ali	Algérie	Impact de la mobilisation des ressources hydriques dans les zones semi-arides sur le développement durable, Cas du bassin de Timgad, Algérie nord oriental

10h30-11h00 Pause café et posters thèmes 4, 5 & 6

11h00-13h00 Thèmes parallèles 2 – 4 – 8

Thème 2 : **Erosion, transport sédimentaire et qualité des eaux (Sylvain Ouillon - Vietnam et Konzi Panise Siamo - RD Congo)**

11h00				
11h20	TADJ	Walid	Algérie	Validation opérationnelle des paramètres hydrodynamiques par une approche métaheuristique
11h40	MIHOUBI	Naouel	Algérie	Fonctionnement hydrologique et débits de fuites du barrage de Hammam Grouz en milieu karstique (Bassin du Haut Rhumel, Algérie)
12h00	HADDOU	Karima	Algérie	Etude de la dynamique des nitrates dans la zone hyporhéique du bassin versant de la Tafna (nord ouest algérien).
12h20	GHERNAOUT	Redhouane	Algérie	Etude et analyse du transport solide en suspension dans le bassin versant de l'oued Mina au droit du barrage de SMBA (NO Algerie)

Thème 4 : **Etiages et relations eaux souterraines/eaux de surface, hydrogéologie karstique (Bamory Kamagate – Côte d'Ivoire et Noureddine Gaaloul - Tunisie)**

11h00	DEHNI	Abdellatif	Algérie	Geoprocessing of hydro-morphometric index for automated sedimentation and erosional models – (Application test in Macta river –Sikkak NW of Algeria)
11h20	DEBIECHE	Taha-Hocine	Algérie	Chimie des eaux du bassin versant de l'oued Nil (NE algérien)
11h40	MEJRI	Sabrina	Tunisie	Tracing groundwater salinization processes in an inland aquifer: a hydrogeochemical and isotopic approach in Sminja aquifer, Northeast of Tunisia
12h00	MARIKO	Adama	Mali	Contribution des eaux souterraines aux écoulements fluviaux et analyse des débits d'étiage dans un contexte de variabilité et de changement climatiques dans le bassin du Bani, Mali
12h20	ZAMOURI	Manoubia	Tunisie	Calibration and validation of a water budget model using surface water and groundwater observations and impacts on low flows estimations- Application to Siliana basin, a Medjerda sub-basin

Thème 8 : Relations homme-environnement et impact sur les ressources en eau et les activités socio-économiques (Mohamed Abdsalam – Mauritanie et Fethi Lachaal - Tunisie)

11h00	KIARI FOUGOU	Hadiza	Niger	Les techniques de pêche et l'accès aux ressources halieutiques dans la partie nigérienne du Lac Tchad
11h20	MOURI	Hassan	Tunisie	L'Etat à l'épreuve de l'incertitude de l'eau d'irrigation dans une zone d'inondation
11h40	MOUHOUCHE	Brahim	Algérie	Maîtrise de l'eau virtuelle des produits agricoles : un moyen de contrecarrer le problème du manque d'eau en Algérie
12h00	MAHLAKENG	Mahlakeng	South Africa	Environmental Conflicts: The case of the Nile River Basin (NRB).
12h20	LACHAAL	Fethi	Tunisie	Effects of human activities and climate changes on groundwater evolution and functioning: case of Grombalia aquifer system (NE of Tunisia)

13h00-14h00 Repas

14h00-16h00 Thèmes parallèles 2 – 4 – 8

Thème 2 : Erosion, transport sédimentaire et qualité des eaux (Mohammed Achite – Algérie et Abdelsalam Ahmed Abdallah - Soudan)

14h00	AMOUSSOU	Ernest	Benin	Evolution sédimentologique dans et dynamique des charges solides dans le complexe fluvio-lagunaire du sud-ouest du Bénin
14h20	ACHITE	Mohammed	Algérie	Quantification, variabilité temporelle et modélisation mathématique du transport solide en zone semi-aride. Cas du bassin versant de l'Oued Wahrane, Algérie (1972-2013)
14h40	ABDALLAH	Abdelsalam Ahmed	Soudan	Challenges facing Atbara Dam Complex (ADC) Sediment Management
15h00	BENSLIMANE	Abir	Tunisie	Guiding soil conservation strategy in headwater Mediterranean catchments
15h20				

Thème 4 : Etiages et relations eaux souterraines/eaux de surface, hydrogéologie karstique (Taha Hocine Debieche – Algérie et Adama Mariko - Mali)

14h00	KAMAL	Safia	Maroc	Etat des lieux de la nappe phréatique du Haouz central : évolution piézométrique et qualité des eaux de la nappe
14h20	HUSSEIN	Mohamed Fahmy	Egypte	Isotope Hydrogeochemistry of the Nile System in the Eastern Sahara
14h40	HADJ-SAID	Samia	Algérie	Alluvial groundwater a vulnerable resource in arid zone
15h00	ELOUMLOUKI	Kaoutar	Maroc	Apport des SIG pour l'étude de la qualité des eaux souterraines en périmètre El Guerdane plaine Souss Massa -Maroc
15h20	DZIRI	Randa	Tunisie	Isotopic and hydrochemical investigation of the karstified carbonate aquifer of the Massif of Zaghouan (Northeastern Tunisia)

Thème 8 : Relations homme-environnement et impact sur les ressources en eau et les activités socio-économiques (Belkacem Bekkoussa – Algérie et Tanor Meissa Dieng - Sénégal)

14h00	BOURGIN	Pierre-Yves	France	Etat et perspectives d'aménagement du bassin du Sassandra en Côte d'Ivoire
14h20	MWINJAKA	Omari	Kenya	The role of science in guiding decision-makers of the EAC Partner States in the development of new water release and abstraction policy for the Lake Victoria

				Basin
14h40	BEKKOUSSA	Belkacem	Algérie	La crise de l'eau dans la wilaya de Mascara (nord-ouest algérien): diagnostic et perspectives
15h00	ABDSALAM	Mohamed	Mauritanie	A Remote Sensing-Based Land Surface Phenology Application for Cropland Monitoring in the Volta River Basin of West Africa
15h20	TRA BI	Armand	Côte d'Ivoire	Impact du changement climatique sur l'agriculture dans le bassin versant du Bouregreg, à l'horizon 2050-2100

16h00-16h30 Pause café et posters thèmes 4, 5 & 6

16h30-18h30 Thèmes parallèles 4 – 5 – 7

Thème 4 : Etiages et relations eaux souterraines/eaux de surface, hydrogéologie karstique (Soussou Sambou – Sénégal et Mohamed Fahmy Hussein - Egypte)

16h30	BELALITE	Halima	Algérie	Les conséquences des variations climatiques sur les eaux souterraines de la plaine de Zana-Chott Saboun wilaya de Batna, Est Algérien
16h50	AZZAZ	Habib	Algérie	Caractérisation du fonctionnement hydrochimique et hydrodynamique des aquifères karstiques par les méthodes d'analyse multivariées (ACP et CAH) : Cas des Monts de Tlemcen (Algérie)
17h10	ALI RAHMANI	Salah Eddine	Algérie	Study of the relationship between drought index and Groundwater recharge, case of an aquifer in a semi-arid area
17h30	AMEUR	Meryem	Tunisie	Aptitude des eaux de la nappe d'oued Rmal (nord- est de la Tunisie) à l'irrigation par les méthodes géochimiques
17h50				

Thème 5 : Evènements extrêmes (Christophe Bouvier-France et Zoubeida Bergaoui - Tunisie)

16h30	KOUASSI KOUAME	Auguste	Côte d'Ivoire	Propagation des ondes de crue le long d'un cours d'eau : cas du fleuve Nzi (Bandama)
16h50	KHOMSI	Kenza	Maroc	Trends in temperature extremes in Morocco
17h10	HASBAIA	Mahmoud	Algérie	Contribution à l'étude du régime des crues dans les bassins semi-arides algériens. Cas du bassin versant du Hodna
17h30				
17h50				

Thème 7 : Modélisation hydrologique et scénarios de ressources en eau (Denis Hughes-Afrique du Sud et Mouhamed Boufaroua - Tunisie)

16h30	TAOUTI	Mohamed Bachir	Algérie	Caractérisation multifractale de la fluctuation temporelle des débits journaliers dans le bassin versant de l'oued Isser (Algérie)
16h50	PATUREL	Jean Emmanuel	France	Tests de robustesse des modèles hydrologiques dans un contexte de changement climatique en Afrique de l'Ouest et Centrale
17h10	OUACHANI	Rym	Tunisie	Amélioration des prévisions saisonnières des précipitations d'un modèle neuronal par Décomposition en modes empiriques d'ensemble et décomposition par ondelettes
17h30	KONE	Salif	Mali	Application de la Modélisation à des Situations Futures et Performances Comparées des Modèles : Sous-bassins du Haut Niger à Koulikoro
17h50	HUGHES	Denis	South Africa	Hydrological modelling of large African river basins

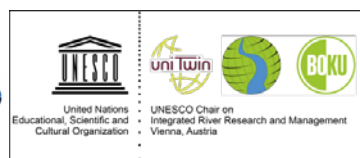
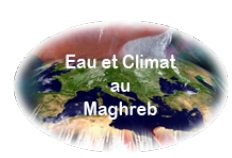
19h30-22h30 Diner de gala à l'hôtel

JEUDI 29 OCTOBRE

8h30-10h30 Thèmes parallèles 7 – 6 – 5

Thème 7 : Modélisation hydrologique et scénarios de ressources en eau (Jean Emmanuel Paturel - France et Ambe Emmanuel Cheo – Allemagne)

8h30	HABAIEB	Hamadi	Tunisie	Essai de reconstitution et de prévision des crues aux stations principales de la Medjerda à l'aval du barrage de Sidi Salem
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8h50	CHETTIH	Mohamed	Algérie	Modélisation de la relation pluie-débit dans les bassins sahariens à l'aide des systèmes hybrides intelligents
9h10	CHEO	Ambe Emmanuel	Allemagne	Estimation of water balances using GROWA model: case study of the Far-North region, Cameroon
9h30	BRIAK	Hamza	Maroc	Application of the swat model on the Kalaya river basin (north of Morocco)
9h50	BOUKHAROUBA	Khadidja	Algérie	Modélisation et prédiction spatio-temporelle des ressources en eau en Algérie

Thème 6 : Bases de données et observatoires (Ulrich Looser – Allemagne et Christophe Brachet - France)

8h30	MAHE	Gil	France	Bases de données dans les programmes de recherche et les réseaux internationaux, l'expérience d'HydroSciences Montpellier
8h50	LOOSER	Ulrich	Allemagne	The global runoff data centre (GRDC); Facilitator between data providers and data users
9h10	JELASSI	Mohamed Aymen	Tunisie	Caractérisation hydrologique de l'Oued Medjerda (Tunisie) dans le cadre de la future mission spatiale SWOT
9h30	GOSSET	Marielle	France	Rainfall measurement from satellite and cellular phone networks : complementary information for the monitoring of rainfall over large river basins in Africa
9h50	CALMANT	Marielle	France	Satellite altimetry : a new tool to complement in-situ networks for the monitoring of large rivers in Africa

Thème 5 : Evènements extrêmes (Hela Karoui – Burkina-Faso et Cyr Gervais Etene - Bénin)

8h30				
8h50	ETENE	Cyr Gervais	Benin	Extrêmes hydro-pluviométriques et dégradation des terres autour du fleuve l'Ouémé à Bonou au Bénin
9h10	KARAHACANE	Hafsa	Algérie	Analyse des extrêmes climatiques dans le bassin de l'Algérois
9h30	BENKHELIFA	Walid	Tunisie	Caractérisations des occurrences des pluies extrêmes et des crues exceptionnelles du bassin versant de la Medjerda au nord de la Tunisie
9h50	KETROUCI	Khadidja	Algérie	Etude des crues extrêmes en Algérie. Cas du bassin versant de la Mekkera

10h30-11h00 Pause café et posters thèmes 7 et 8

11h00-13h00 Thèmes parallèles 1 – 7

Thème 7 : Modélisation hydrologique et scénarios de ressources en eau (Pierre Hubert – France et Mohamed Chettih - Algérie)

11h00	BODIAN	Ansoumana	Sénégal	Evolution des apports en eau au barrage de Manantali à l'horizon 2050
11h20	BENJAARFAR	Aymen	Tunisie	Analysis of the worth of rainfall-runoff information using statistical entropy concepts
11h40	AMMARI	Abdelhadi	Algérie	To improve the use of Entropy theory for flow monitoring in gauged and ungauged river sites
12h00	YOUB	Saïd	Algérie	Contribution a la Modelisation numerique des ecoulements turbulents a surface libre - fond fixe
12h20	PAIZ	Marie-Claire	Gabon	A Freshwater Conservation Atlas for Gabon and the Ogooué River Basin

Thème 1 : Changement global, climatologie et régimes hydrologiques (Gil Mahe – France et Bastien Dieppois – Royaume Uni)

11h00	ABID	Nesrine	Tunisie	Time series analysis of actual evapotranspiration estimated using rainfall-runoff budget. Application to Medjerda basin
11h20	DIEPPOIS	Bastien	Royaume Uni	Winter and summer Southern African rainfall variability: An investigation of dominant timescales, their teleconnections and processes
11h40	NGUIMALET	Cyriaque-Rufin	République Centrafricaine	Characterization of the Oubangui River's hydrological drop at Bangui, Central African republic
12h00	MRAD	Dounia	Algérie	Detection of trends and changes in monthly maximum daily rainfall in North Eastern Algeria
12h20	TSHITENGE	Jean Marie	RD Congo	Wavelet Analysis on the Variability and the Teleconnectivity of the Rainfall of the Congo Basin for 1940 – 1999.

13h00-13h20 Cérémonie de clôture Chair : Hamadi Habaieb – Tunisie, Bamory Kamagate – Côte d'Ivoire et Gil Mahé - France

13h20-14h30 Repas

14h30-15h30 : Ateliers des programmes FRIEND en Afrique : Méditerranée, Afrique de l'Ouest et Centrale, Nil et Afrique Australe.

15h30-18h30 Visite de Hammamet, medina.

VENDREDI 30 OCTOBRE

9h00-10h30 : Atelier du programme UNESCO Afrique de révision des normes hydrologiques. Abou Amani – UNESCO Nairobi

10h30-11h00 Pause café

Départ des participants

Durée des communications 15 minutes et 5 minutes de questions. 5 communications pour 2 heures
6 communications invitées de 30 minutes chacune.

SESSIONS POSTERS

Thème 1 : Changement global, climatologie et régimes hydrologiques

ZEROUALI	Bilel	Algérie	Analyse et cartographie des tendances pluviométriques dans le bassin versant de l'oued Sebaou (nord-centre de l'Algérie)
ABBES	Malika	Algérie	Suivi de la sécheresse par l'Indice de Précipitation Standardisé dans le bassin versant du Chélif
MAHDID	Souhil	Algérie	Fonctionnement hydrologique du bassin versant de l'oued Nil (Wilaya de Jijel, NE algérien)
HAMEL	Mohammed	Algérie	Contribution à l'étude de l'impact des changements climatiques sur les ressources hydriques -cas du bassin versant de la Tafna
ELMAHI	Aicha	Algérie	L'ampleur de la variabilité climatique dans le bassin versant de l'oued El Hammam (nord-ouest d'Algérie)
BENAINI	Mohammed	Algérie	Etude de la variabilité spatio-temporelle des précipitations annuelles dans le Nord-Est d'Algérie. Application de l'Analyse en Composantes Principales (ACP)
ACHITE	Mohammed	Algérie	Une approche statistique pour l'étude de la variabilité climatique en zone semi aride. Cas du bassin versant de Zahrez, Algérie

Thème 2 : Erosion, transport sédimentaire et qualité des eaux

NAZHA	Asserar	Maroc	Caractérisation de l'érosion hydrique des sols dans le bassin versant de Ben Ahmed, Maroc central
KHERFANE	Wahida	Algérie	Comparaison des différents systèmes d'aération des stations d'épuration à boues activées
DEHBI-ZEBBOUDJ	Aicha	Algérie	Les algues, les cyanobactéries et la qualité des eaux de l'oued Soummam (Bejaia, Algérie)
BOUKSILA	Fethi	Tunisie	Etude pédologique et analyse cartographique pour la lutte contre l'érosion hydrique. Cas du bassin versant de l'oued Maiz (Tunisie centrale)
BENBACHIR	Mohamed	Algérie	L'effet de l'humidité initiale du sol sur le rejaillissement des particules sous l'impact de la goutte de pluie.
AYADI	Imen	Tunisie	Variabilité spatio-temporelle des taux d'érosion estimée de l'envasement des lacs collinaires en Tunisie centrale

Thème 4 : Etiages et relations eaux souterraines/eaux de surface, hydrogéologie karstique

MIHOUB	Redouane	Algérie	Detection des zones géothermique par interpretation des parametres physico-chimiques
AMEUR	Meryem	Tunisie	Caractérisation de la qualité des eaux de la nappe de Sminja dans la région de Zaghouan (Nord-est de la Tunisie) par les méthodes statistiques multivariées
ZOUINI	Deradji	Algérie	Hydrologie, fonctionnement et valorisation du système hydraulique des Guelta d'Iherir (Tassili des Ajjers), Sahara algérien
AZLAOUI	Mohamed	Algérie	Gestion intéree des ressources en eau de la wilaya de Djelfa. Application à la modélisation hydrodynamique de la nappe du synclinal d'Ain el Bel

Thème 5 : Evènements extrêmes

ABDA	Zaki	Algérie	Modélisation des debits extremes par les reseaux neuronaux artificiels et les systemes a inference neuro-floue, application aux bassins cotiers algerois
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Thème 6 : Bases de données et observatoires

LAIGNEL	Benoit	France	Utilisation du futur satellite SWOT pour l'étude de la variabilité hydrologique temporelle et spatiale des fleuves français et perspectives pour les fleuves africains
LAIGNEL	Benoit	France	Relations entre variabilité hydrologique et fluctuations climatiques (NAO, SOI)
FEKI	Haifa	Tunisie	Combining geostatistics and simulated annealing for rainfall monitoring network optimization over all Tunisia

Thème 7 : Modélisation hydrologique et scénarios de ressources en eau

LAGOUN	Ali Mansour	Algérie	Pollution des cours d'eau et rivières : Simulation physique d'un rejet accidentel sur un modèle réduit
CASSE	Claire	France	Estimation des pluies par satellite et modélisation hydrologique sur le fleuve Niger
KHADRI	Samira	Algérie	Gestion des ressources en eau dans le bassin versant de la moyenne Seybouse (Nord est Algérien): contribution du modèle WEAP

Thème 8 : Relations homme-environnement et impact sur les ressources en eau et les activités socio-économiques

TARMOUL	Nadia	Algérie	Impact des actions anthropiques sur l'évolution morphologique et hydrologique du moyen Sébaou cas d'extraction du sable alluvionnaire.
MANYARI	Waleska	Bresil	Downstream impact of dams
FEDDAL	Mohamed Amine	Algérie	Analyse de l'effet des techniques culturales simplifiées sur la conservation de l'eau et risque de pollution
DEBIECHE	Taha-Hocine	Algérie	Effet des activités anthropiques sur la qualité des eaux de source. Cas du bassin versant de l'oued Nil (NE algérien)



Hotel Houda Yasmine Hammamet 29 octobre 2015