

Tekeze - Atbara Regional Conference report:

River basin simulation for improved transboundary water management in the Nile: Case study of the Tekeze-Atbara sub-basin

Khartoum, Sudan 24-26 March 2019



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Introduction

The Tekeze-Atbara Regional Conference organized by the HRC-Sudan, EiWR-AAU and IHE Delft has been successfully held in Khartoum Sudan during the period 24-26 March, 2019.

The regional conference marked the successful completion of Phase 1 of T-A sim project: ***“River basin simulation for improved transboundary water management in the Nile: Case study of the Tekeze-Atbara sub-basin”*** and announced the launching of Phase 2: ***The Tekeze-Atbara sub-basin: From river basin simulations towards cooperative approaches for transboundary water management.***

The objective of the conference is to provide a platform to disseminate and discuss outputs of the Tekeze-Atbara river basin simulation project, as well as to invite the wider community of researchers working on the Tekeze-Atbara and/or Nile Basin water related subjects to present and discuss their research outputs.

The conference was attended by around 120 people from Sudan, Ethiopia, Netherlands, Germany and Brazil (Annex 1), representing project partners, stakeholders from the region; including the Minister of Water Resources, Irrigation and Electricity (MoWRIE) of Sudan; H. E Dr. Osman Eltom Hamad , the Ambassador of the Democratic Republic of Ethiopia in Sudan H. E Ato Shiferaw Jarso, representative of the Ethiopia-ESTAC (Ethiopia-Sudan Technical Advisory Committee), and representative of the Sudanese embassy in Addis Ababa . In addition to participants from various fields: academia, research community, policy makers, as well as practitioners. The event has been widely covered by local media (TV, Radio and daily newspapers) (Annex 3).

The conference consisted of six sessions including 17 presentations and 4 keynote speeches covering the following themes: Simulation and Optimization of Transboundary Reservoirs Systems, Watershed Management in Tekeze-Atbara basin, Climate Change: Impacts and Adaptation Practices, Water Governance and Hydro-economics, Innovative Tools and Techniques for Improved Water Resources Management and Sedimentation and Morphological Modelling. The conference program is shown in Annex 2.

The conference concluded by affirming the needs to explore the possible institutional set-ups for transboundary water management in T-A sub-basin given the interesting results from T-A research project.

The conference was mainly funded by the DUPC2 - IHE Delft Global Partnership for Water and Development. Furthermore, it was sponsored by MoWRIE-Sudan, Embassy of Democratic Republic of Ethiopia in Khartoum, DAL Group Company and Ethiopian Airlines. We take this opportunity to thank these sponsors for their generous support.

Day 1:

Day 1 started with the opening session where welcoming remarks were delivered by the Conference Organizers and H.E Ato Shiferaw Jarso-Ambassador of the Democratic Republic of Ethiopia in Sudan. Thereafter , a presentation about T-A sim Project was delivered by Prof. Yasir A. Mohamed, Director General of HRC-Sudan which provided an overview about T-A sim project and its activities. The opening session was ended by the official opening speech delivered by H.E Dr. Osman Eltom Hamad -Minister of Water Resources, Irrigation and Electricity of Sudan followed by a group photo for all conference participants.



Photo¹: H.E Dr. Osman Eltom Minister of Water Resources and H.E Ato Shiferaw Jarso the Ethiopian Ambassador



Photo¹: Prof. Yasir A. Mohamed - D.G of HRC-Sudan
Presenting T-A project overview



Photo¹: Ms. Sarah Abdalla –Presenting Welcoming Remarks on
Behalf of Organizing Committee

Besides the opening session, Day 1 consisted of three technical sessions. In the first session on Simulation and Optimization of Transboundary Reservoirs Systems, the T-A project team members from HRC-Sudan and EiWR-AAU presented the research results.



Photo²: Mr. Yonas Girma (EiWR-AAU) and Mr. Yasir Hageltom (HRC-Sudan) presenting T-A research findings

The session also included a keynote speech by Executive Director of Eastern Nile Technical Regional Office (ENTRO)- Ato Fekahmed Negash that discussed how to turn the Tekeze- Atbara into a Model of effective sub-basin cooperation. In addition, two related presentations were delivered by an MSc project student from IHE Delft and a researcher from HRC-Sudan.



Photo²: Ato Fekahmed Negash delivering keynote speech

The second session on Watershed Management in Tekeze-Atbara basin included a keynote speech on joint transboundary research to promote hydro-solidarity by Prof. Pieter Van der Zaag from IHE Delft in addition to three related presentations by researchers from the region.



Photo²: Prof. Pieter van der Zaag and Mr. Tesfay Gebremicael from IHE Delft delivering their presentations

The last session of Day 1 focused on Climate change impacts and adaptation practices where a key note speech was delivered by Prof. Dimitri Solomatine from IHE-Delft in addition to a presentation on predicting the impacts of climate change variability on crops production within rain-fed agriculture schemes in Tekeze-Atbara sub-basin.



Photo²: Discussion on climate change impacts and adaptation practices (L-R: Dr. Igbal Salah, Ato FekAhmed Negash and Prof. Dimitri Solomatine)

Day 1 was concluded by a dinner hosted by the Embassy of the Democratic Republic of Ethiopia in Khartoum. We take this opportunity to thank the embassy for their generous gesture and giving us the chance to enjoy the Ethiopian aroma and taste in Sudan.



Photo³: Conference participants enjoying the dinner hosted by the Ethiopian Embassy in Khartoum

Day 2:

Day 2 of the conference consisted of three oral sessions, one poster session, in addition to a session on follow up research in Tekeze-Atbara sub-basin.

The first session focused on Water Governance and Hydro-economics. Within the session a key note speech on Hydro-politics was presented by Prof. Yacob Arsano from Addis Ababa University followed by two related presentations by a project MSc student from IHE Delft and researcher from the region.



Photo⁴: Ms. Iara Giacomini from IHE Delft presenting her MSc findings

The session also included a panel discussion led by Ms. Jenniver Sehring from IHE Delft; where a debate on scale issues of water governance in transboundary river basins took place. The session allowed detailed discussion of concept of basin scale versus transboundary water cooperation among the panelists.



Photo²: Panel discussion on water governance lead by Ms. Jenniver Sehring

The second session consisted of three presentations by regional and international researchers that provided an overview of different Innovative Tools and Techniques for Improved Water Resources Management.



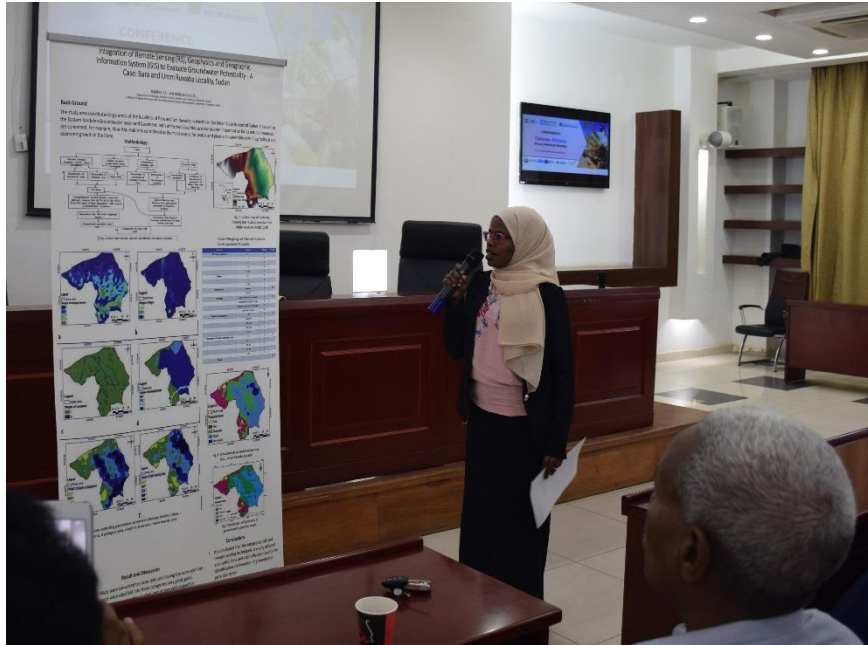
Photo²: Dr. Christof Lorenz from (IMK-IFU) delivering his presentation

The third session in Day 2 focused on Sedimentation and Morphological Modelling. Within the session four presentations were delivered by researchers from the region covering a variety of related topics.



Photo²: Ms. Maysoon Osman from University of Khartoum delivering her presentation

The oral presentations were followed by a session for poster presentations where two posters covering different hydrological topics were presented.



Photo²: Poster Presentation on Evaluation of Groundwater potential using GIS and RS

At the end of the day, a session was held to discuss the follow up research in Tekeze-Atbara sub-basin. The research aims to investigate the possible institutional set-ups for transboundary water management in Tekeze-Atbara sub-basin given the results from the T-A Sim project.



Photo²: Follow up research session by Prof Yasir from HRC-Sudan, Ms. Jenniver Sehring from IHE- Delft and Mr. Yonas Girma from EiWR-AAU

Day 3:

On Day 3 the conference participants visited the “Meroe Pyramids”, built around 4000 years ago, on the Eastern Bank of the Nile, at 200 km north of Khartoum. Although recognized as a UNESCO World Heritage Site, yet they remain relatively unknown. A tour guide accompanied the participants and provided them an insight about the historical background of the monuments while answering all queries of the participants.



Photo³: Field trip to Meroe Pyramids (Ethiopian participants along with Ethiopian Ambassador)

Photo Credits:

- 1: Abdul Azeez Hassan Abbas and Mohammed Ali Bakhiet (DIU)
- 2: Mamo Kassegn and Yonas Girma
- 3: Prof. Dimitri Solomatine
- 4: Prof. Pieter Van Der Zaag

Annex 1: List of Conference Participants

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Annex 2: Conference Program



Regional conference on

Tekeze Atbara Water Related Studies

24-26 March 2019

Khartoum, Sudan



Conference Program

Tekeze – Atbara, An Important basin with high social and economic significance, yet a basin largely off the radar.

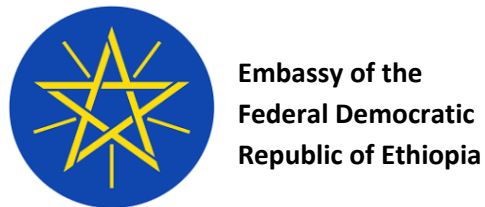
The Tekeze- Atbara Conference aims to shed the light on this important sub-basin by gathering renowned experts, policy makers and scientists from across the Nile region and beyond to discuss and advance scientific know-how on water issues as well as highlight and promote varied societal benefits.

The research project “*River basin simulation for improved transboundary water management in the Nile: Case study of the Tekeze-Atbara sub-basin*”, has successfully been completed in February 2019, with highly interesting outputs. The conference is an ideal platform to disseminate and discuss these research findings. Similarly, the conference is also an excellent opportunity for the wider research community working on Tekeze-Atbara and/or Nile Basin water related subjects to present and discuss their research outputs.

Participants from various fields: academia, research community, policy makers, as well as practitioners are attending the conference, which provides an excellent environment to exchange knowledge, and discuss research outputs and its impact on the ground.

The third day of the conference is a visit to the historic site of the “**Meroe Pyramids**”, built around 4000 years ago, on the Eastern Bank of the Nile, at 200 km north of Khartoum. Although recognized as a UNESCO World Heritage Site, yet they remain relatively unknown.

Sponsored by



Conference committees

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Prof. Yasir A. Mohamed – The Hydraulics Research Centre, Sudan

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Ms. Maweya D. Abdelgader - The Hydraulics Research Centre, Sudan

Mr. Yonas Girma Abebe - Ethiopian Institute of Water Resources, Ethiopia

Mr. Mamo Kassegn - Ethiopian Institute of Water Resources, Ethiopia

Mr. Ahmed Abu Sin - The Hydraulics Research Centre, Sudan

Mr. Ammar Abbaker – Technical Water Organ, Ministry of Water Resources and Electricity, Sudan

Conference Program:

Time	Day 1: Sunday - 24 March 2019	
08:00 - 09:00	Registration	
09:00 - 10:30	Opening Session	
	Welcoming remarks by the organizing committee	Eng. Sarah Abdalla
	Tekeze Atbara Documentary Film	Eng. Mamo Kassegn
	River basin simulation for improved transboundary water management in the Nile; the case of Tekeze Atbara sub-basin	Prof. Yasir A. Mohamed
	Welcoming remarks IHE- Delft	Prof. Pieter van der Zaag
	Welcoming remarks EiWR-AAU	Dr. Zeleke Agide
	Welcoming remarks of Guests representatives	H.E. Ambassador Ato Shefiraw Jarso
	Official opening by the Guest of Honor	Minister of Water Resources, Irrigation and Electricity, Sudan
10:30 - 11:00 AM	Tea/Coffee Break and Group Photo	
11:00 -13:00	Session 1: Simulation and Optimization of Transboundary Reservoirs Systems	Convener: Mr. Wubeshet Demeke Tefera
11:00 -11:30	Keynote Speech: “Water Science in the Service of Eastern Nile Cooperation”: Turning the Tekeze-Atbara into a Model of effective Sub-basin cooperation	Ato Fekahmed Negash, ENTRO
11:30 -12:00	River basin simulation for improved transboundary water management in the Nile-Tekeze Atbara	Yonas Girma EiWR; Yasir M. O. Hageltom, HRC- Sudan
12:00 -12:15	Optimization of transboundary reservoir system in the Nile basin: the Tekeze-Atbara case study	Mr. Kibrewosen Z. Belay, IHE Delft

12:15-12:30	The impacts of upstream reservoirs on the downstream water allocation in the Eastern Nile	Mrs. Hiba Amin Musa, HRC-Sudan
12:30 -13:00	Discussion	
13:00 -13:45	Lunch Break	
13:45 -15:30	Session 2: Watershed Management In Tekeze Atbara Basin	Convener: Prof. Seifeldin Hamad Abdalla
13:45 - 14:15	Keynote Speech: Joint transboundary research to promote hydro-solidarity: the case of the Blue Nile	Prof. Pieter van der Zaag, IHE Delft
14:15 - 14:30	The Impact of Watershed Management on Surface Water Runoff Using Remote Sensing in Tekeze-Atbara Basin	Dr. Khalid Biro, HRC-Sudan
14:30- 14:45	Identification and Prioritization of Sub-watersheds for land and Water Management in Tekeze dam watershed, Northern Ethiopia	Mr. Kidane Welde, Tigray Agricultural Research Institute
14:45 - 15:00	Hydrological response to land management dynamics in the headwaters of Tekeze-Atbara basin. Application of parsimonious hydrological modelling, alteration analysis and PLSR analysis	Mr. Tesfay Gebremicael, IHE-Delft, Netherlands
15:00 - 15:30	Discussion	
15:30 - 16:00	Tea/Coffee Break/ Exhibition	
16:00 -17:30	Session 3: Climate Change: Impacts and Adaptation Practices	Convener: Ato Fekahmed Negash, ENTRO
16:00 -16:30	Keynote Speech: Optimization techniques helping to promote transboundary water cooperation: hydro-informatics approach	Prof. Dimitri Solomatine, IHE Delft

16:30 -16:45	Prediction of Future Crop Yields in Rain-fed Agriculture Schemes in Tekeze-Atbara basin: The Case of Gadaref scheme, Sudan	Dr. Igbal Salah, MoWRIE- Sudan
16:45 -17:00	Climate Change Adaptation Practices in the Upper Tekeze River Basin, Northern Ethiopia	Dr. Kifle Woldearegay, Mekelle University, Ethiopia
17:00 -17:30	Discussion	
18:00 - 20:00	Conference Dinner (Hosted by the Embassy of Democratic Republic of Ethiopia in Khartoum)	

Time	Day 2: Monday - 25 March 2019	
09:00 -10:30	Session 4: Water Governance and Hydro-economics	Convener: Pieter van der Zaag
09:00 -09:30	Key Note Speech	Prof. Yacob Arsano, Addis Ababa University, Ethiopia
09:30 -09:45	Institutionalizing cascade dam cooperation in the Tekeze-Atbara sub-basin	Ms. Iara Bueno Giacomini, IHE-Delft
09:45 -10:00	The Potential Role for Hydro-Economic Projects on Sustainable Development: A Case of Tekeze-Atbara Basin	Dr. Ahmed Elshaikh, Ministry of Water Resources, Irrigation and Electricity, (MoWRIE)- Sudan
10:00 -10:45	Panel Discussion: Debate on: Scale issues of Water Governance in Transboundary River Basins	Moderator :Ms. Jenniver Sehring
10:45 -11:00	Tea/Coffee Break	
11:00 -12:30	Session 5: Innovative Tools and Techniques for Improved Water Resources Management	Convener: Prof. Dimitri Solomatine
11:00 -11:15	Regionalized global and seasonal information for the transboundary water management	Dr. Christof Lorenz, Institute of Meteorology and Climate Research (IMK-IFU), Germany
11:15 -11:30	Blending rainfall dataset from in-situ and Multi-Source Weighted Ensemble Precipitation for environmental management over the upper Blue Nile Basin.	Dr. Dejene Sahlu, Abbay Basin Authority, Ethiopia
11:30 -11:45	Evaluation of satellite rainfall product through streamflow simulation on Upper Tekeze-Atbara basin.	Mr. Masresha Ashenafi, EiWR-AAU, Ethiopia
11:45 -12:00	Simulations of soil moisture by using Remote Sensing technique in Awramba watershed, upper Blue Nile Basin, Ethiopia	Mr. Berhanu G. Sinshaw, University of Gondar, Ethiopia
12:00 -12:30	Discussion	

12:30 -13:30	Lunch Break	
13:30 -15:00	Session 6: Sedimentation and Morphological Modelling	Convener: Eng. Khidir Gasm Elseed
13:30 - 13:45	Use of Hydrodynamic and morphologic models for the management of the seasonally flooded Mayas wetlands in the Dinder National Park-Sudan	Mr. Khalid Hassaballah, HRC-Sudan/IHE Delft
13:45 - 14:00	Integrating linear spectral unmixing analysis and hydrologic model for enhancing sediment yield prediction, the case of data scarce upper Tekeze basin, Ethiopia.	Mr. Hagos Gebreslassiea, EiWR-AAU, Ethiopia
14:00 - 14:15	Channel bend analysis of Gumara River based on curvature radius and channel width, Upper Blue Nile basin, Ethiopia	Dr. Mengiste Abate, Bahir Dar University, Ethiopia
14:15 - 14:30	Impact of the Grand Ethiopian Renaissance Dam on the Blue Nile Discharges and Sediment Loads at Eldeim Station	Ms. Maysoon Osman, University of Khartoum, Sudan
14:30 - 15:00	Discussion	
15:00 -15:30	Tea/Coffee Break	
15:30– 16:00	Poster Presentations	
16:00 -17:00	Follow up research in the Tekeze-Atbara sub-basin	Yasir A. Mohamed; Zeleke Agide; Jenniver Sehring

Time	Day 3: Tuesday 26 March , 2019 : Trip to Black Pyramids of Meroe at Begarawiyah **	Sarah, Yasir, Ebaa
06:00 -10:00	Travel to Begarawiyah	
10:00 -12:30	Visit Pyramids and tour around the site	
12:30 -01:30	Lunch (Traditional Food)	
01:30 -17:30	Travel Back to Khartoum	

**** Meroe** is an ancient city that was capital of the Kingdom of Kush, which was ruled by the Nubian kings. Up to 4,600 years old, the pyramids of Meroe were built in “Nubian style” marked by steep slopes and small bases. These pyramids are not only striking. They're numerous!! More than **200 pyramids** marking the tombs of royalty of the Kingdom of Kush. They are recognized as a **UNESCO World Heritage Site**, yet they remain relatively unknown.

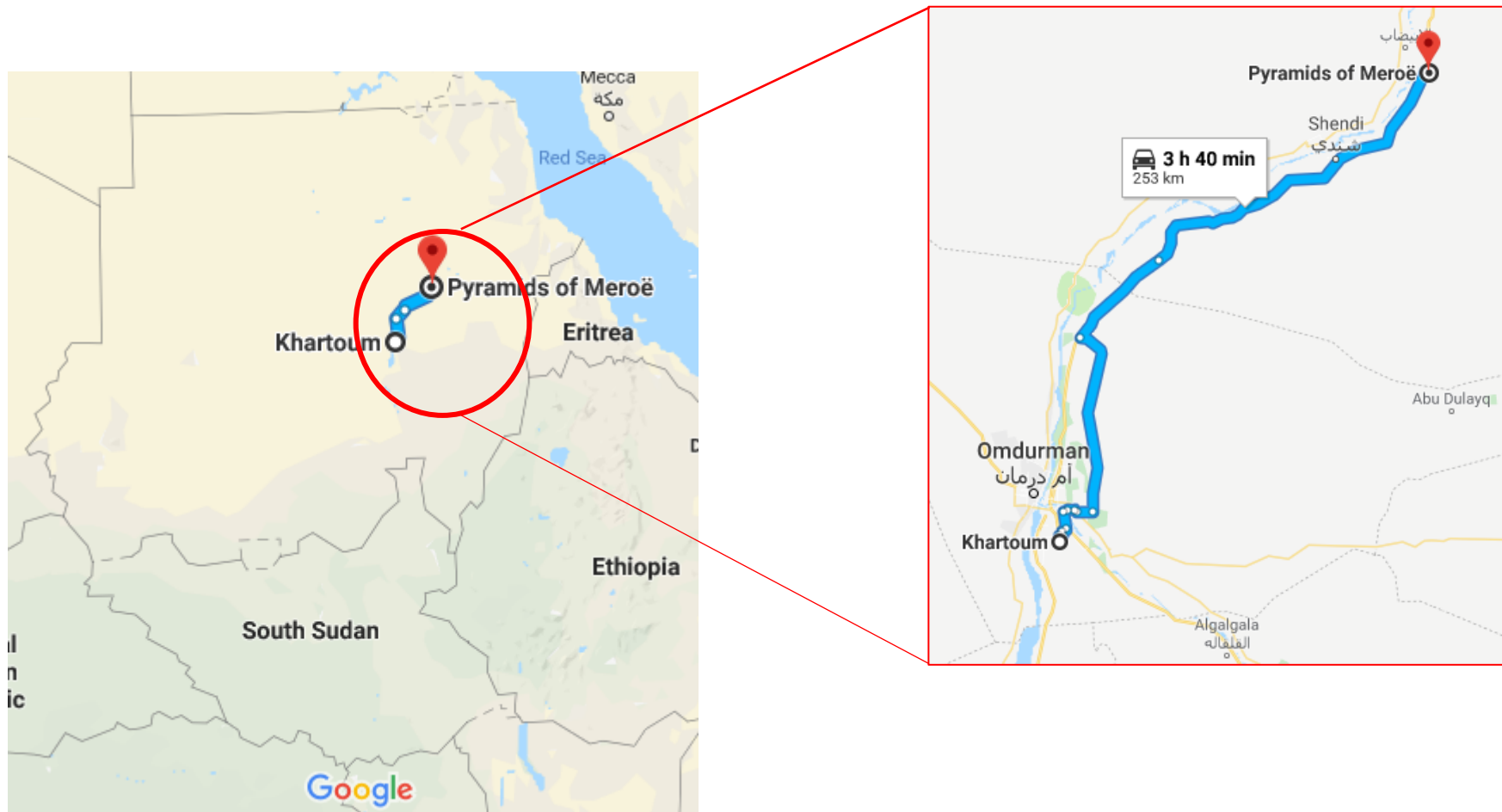
Please join us on this trip to visit this remarkable site!!!!



Photo of Meroe Pyramids (Taken by: *Rozemarijn ter Horst*)

Location and Route Map:

Meroe is located on the east bank of the Nile about 6 km north-east of the Kabushiya station near Shendi, Sudan, approximately 200 km north-east of Khartoum. Near the site are a group of villages called **Bagrawiyah**.



No.	Poster Presentations
1	<p>Integration of Remote Sensing (RS), Geophysics and Geographic Information System (GIS) to Evaluate Groundwater Potentiality -A Case: Bara and Umm Ruwaba Locality, Sudan</p> <p>Braa Abdelwdood, MoWRIE-Sudan</p>
2	<p>Forecasting Water Levels using Artificial Neural Networks</p> <p>Fatema Abbakar Suliman Habeeb, MoWRIE-Sudan</p>
3	<p>Hydrological Watershed Modeling, Study area Khor Abu Fargha, ElGedaref State, Sudan</p> <p>Israa Gafaar, MoWRIE-Sudan</p>

Annex 3: Media coverage

The workshop has been covered by high quality media in various local TV and newspapers. In addition, a report about the conference was radiocasted on Sudan National Radio.

The Links for the TV interviews and reports are:

- **S24:** A TV report and interview was broadcasted with Prof. Abu Obeida a team of T-A project with the following link:

<https://youtu.be/N6s2YE2FZMQ>

- **Alsherooq TV:**

<https://youtu.be/vCY0Y6MwtBU>

- **Alsudan TV and Khartoum TV:**

<https://youtu.be/jdFWkxc5Olg>

- **Dam Implementation Unit Electronic Weekly Newsletter:**

<http://diu.gov.sd/ar/home/pages/show/991>

Newspaper Strips:

- **Alwan Newspaper:** (No: 1905 - page 9, issue date: 25/03/2019)

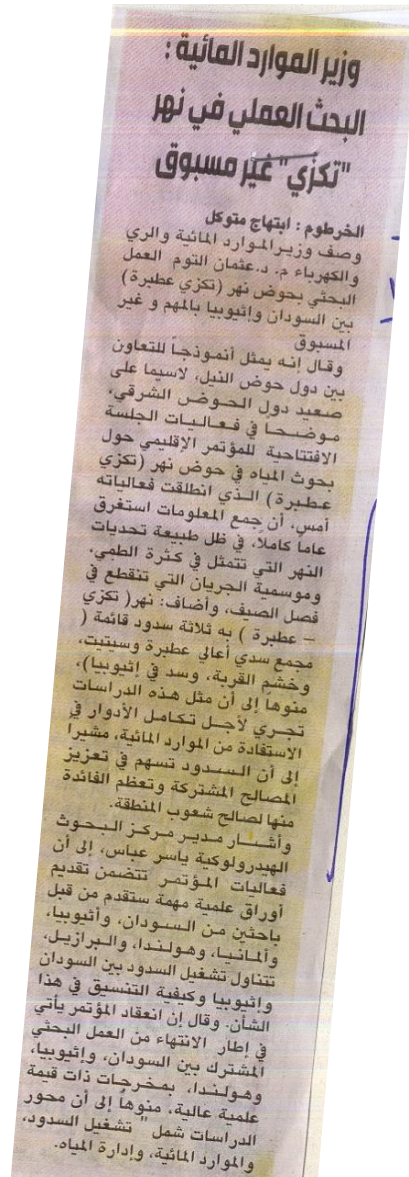




- Alwatan Newspaper: (No: 5573-page 6, issue date: 26/03/2019)



- Alsudan Newspaper: (No: 4726-page 6, issue date: 25/03/2019)



- Alrai Al'aam Newspaper:

(No: 65147-page 4, issue date: 25/03/2019)



(No: 65158-page 7, issue date: 07/04/2019)



- Akhbar Al'yaoum Newspaper: (No: 98501-page 5, issue date: 11/04/2019)



تعتبر البحوث والدراسات من الاهمية بمكان في عصرنا هذا واصبحت تلعب ادوارا هامة ورئيسية في تقدم الدول وتطور مجتمعاتها وأضحت هي الطريقة العلمية والمثلى للتطور الصناعى والاقتصادى والاجتماعى والسياسى كل حسب تخصصه ومجاله فأولت الدول البحوث اهمية كبرى من حيث الاهتمام من جهة ومن حيث التنسيق والتمويل من جهة اخرى خاصة الدول المتقاربة اقليميا .

مؤخرا عقد بدار الشرطة بالخرطوم في (٢٤-٢٥) مارس الماضى بتشريف وزير الموارد المائية والرى والكهرباء م . عثمان التوم ومدير مركزالبحوث الهيدروليكية ب. ياسر عباس مؤتمرا اقليميا لبحوث المياه في حوض نهر تكزى - عطبرة للدراسة التي اعدت شراكة بين مركز البحوث الهيدروليكية التابع لوزارة الموارد المائية والرى والكهرباء بالسودان ومعهد ادارة الموارد المائية بجامعة اديس ابابا باثيوبيا ومعهد IHE دلفت بهولندا لمناقشة مخرجات الدراسة البحثية المشتركة بين السودان واثيوبيا لتشغيل وادارة منظومة الخزانات بحوض نهر عطبرة - تكزى بين اصحاب المصلحة والباحثين بين البلدين وفتح فرص لدراسات وبحوث اخرى متعلقة بمجال دراسات حوض نهر عطبرة - تكزى .

تم عرض عدد (١٦) ورقة علمية بالمؤتمر تناولت (٦) محاور رئيسية هي استعمال النماذج الرياضية في ادارة منظومة الخزانات والموارد المائية المشتركة وادارة الاحواض المائية وتغيير المناخ (الاثار واساليب التكيف والترسيب والتغيرات الموفولوجية وحوكمة المياه والاقتصاد المائى واستخدام التقنيات والتكنولوجية الحديثة في تحسين ادارة الموارد المائية .

خرج المؤتمر الاقليمى لحوض نهر عطبرة - تكزى بتوصيات عديدة تساهم في رفد البحوث والدراسات في منطقة الحوض اهمها تثمين دور البحث العلمى المشترك في تعظيم الفائدة المرجوة من ادارة الموارد المائية المشتركة والتوجيه باهمية بدا المرحلة التالية في الدراسة البحثية والتوجيه كذلك باجراء بحوث متخصصة حول التكوينات الموسمية لادارة المياه العابرة للحدود في نفس الحوض

شارك في المؤتمر عدد من الباحثين والاكاديميين يمثلون عدد من الدول السودان واثيوبيا وهولندا والمانيا والبرازيل اسهموا في النقاش والحوار للاوراق العلمية المقدمة في المؤتمر والتوصيات التي خرج بها .

ينبع نهر عطبرة - تكزى من اوساط الهضبة الاثيوبية بالقرب من جبل غاشين ويعرف في اثيوبيا باسم تكزى وفي السودان يعرف بنهر سبتيت قامت الدولة الاثيوبية بانشاء سد على النهر لتوليد الطاقة الكهربائية والتي تبلغ (٣٠٠) ميغاواط مما احدث نتائج ايجابية على السودان اولها انسياب نهر عطبرة طوال العام بعد ان كان موسمى وتقليل الاطماء على خزان خشم القرية الذي تناقص منسوب بحيرته بسبب تكاثر الاطماء بينما تقوم الدولة السودانية بانشاء مجمع سدى اعالي عطبرة وسيتم انتاج (٣٢٠) ميغاواط من الكهرباء تضاف الى الشبكة القومية فضلا عن رى مساحات شاسعة من الاراضى لغرض الزراعة مما يستدعى التعاون بين الدولتين لتنظيم وتنسيق جريان النهر واداء البحوث والدراسات المشتركة بين الدولتين لفائدتها المشتركة .

عصام محمد صالح

في شان المؤتمر الاقليمى لبحوث المياه في حوض نهر تكزى - عطبرة بالخرطوم



Annex 4: Photos from the conference:

















