Earth Observation Data for Disaster Management and Risk Reduction in Sudan

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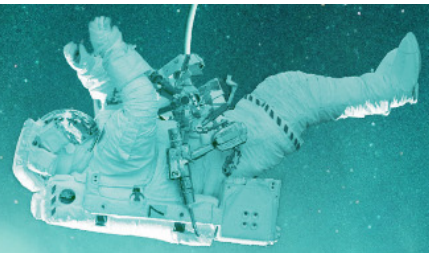


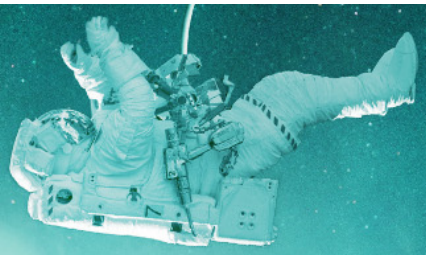
Introduction

Remote Sensing & Seismology Authority (RSSA)

Remote Sensing & Seismology Authority (RSSA) since the establishment in late 70s plays a vital role in sustainable development of natural resources in the Sudan and builds strong knowledge in geoinformatics.

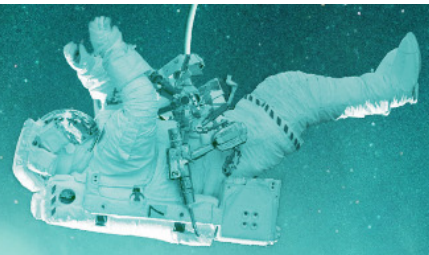
Mandates

- Propose the main policies of the space sciences and technology field (RS and GIS).
- Conduct scientific researches in the field of RS, GIS, and GPS
- Technically coordinate the efforts and activities related to space technology making use of local and foreign expertise.
- Offer the necessary training in the field of space sciences and technology.
- Establish a link between Sudan and regional and international centers and organizations that are active in the field of space sciences and technology.
- Provide the individuals and the local and international organizations with the technical services and consultations in RS and GIS.



Activities

- RSSA programs and activities include project studies for;
  - Natural resources management,
  - Environmental monitoring
  - Disaster management,
  - Human capacity development through education, training, and workshops, and awareness programs for professional as well as public awareness.
- All programs aim at:
  - Building and development of knowledge
  - Capacity building in the field of remote sensing and GIS

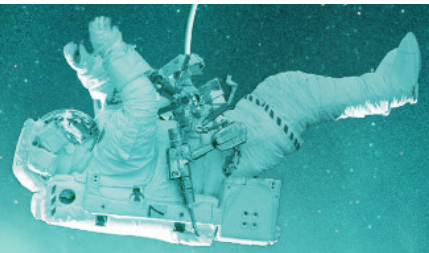


Disaster Risk in Sudan

- Sudan is one of the most vulnerable developing countries with challenges from various natural and manmade disasters .
- This cause devastating impact on human life, infrastructures , properties , economy and environment.
- The Sudan National Strategy for Disaster Risk Reduction (SNSDRR) addresses the real need for new approaches and initiatives for Disaster Risk Reduction.
- Remote sensing and emerging techniques plays a vital role in descion making support to reduce disaster impacts
- The SDGs and Sendai framework emphasis on mapping and RS as major tools for successfully assessing vulnerability and planning adaptation activities.

Flood Hazard in Sudan

- In terms of flood, Sudan is characterized by two major flood types;
  - riverine floods along the Nile and its tributaries,
  - and flash flood that is caused by heavy rainfall.
- The riverine flood is considered to be manageable or can be predicted easily when compared with flash flood that is caused by rainfall.

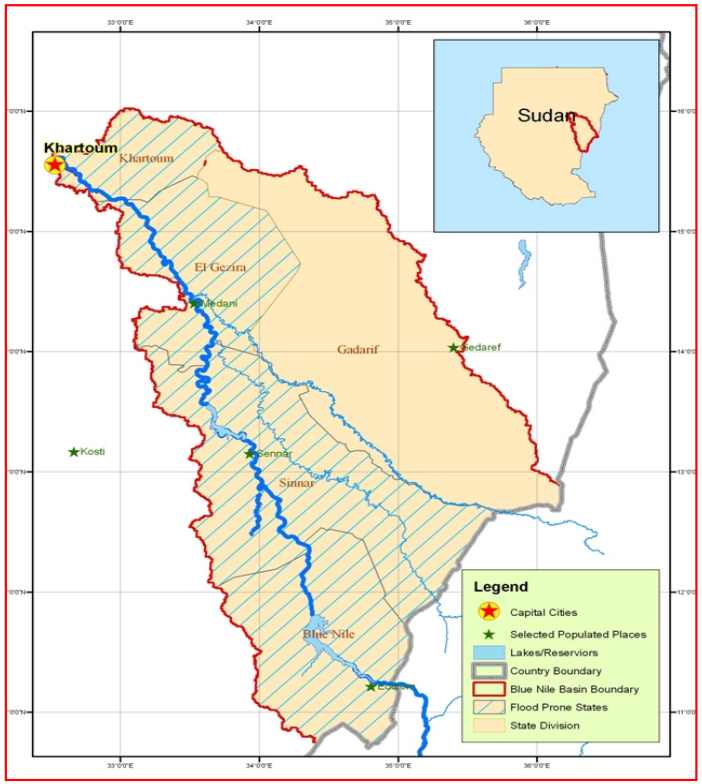


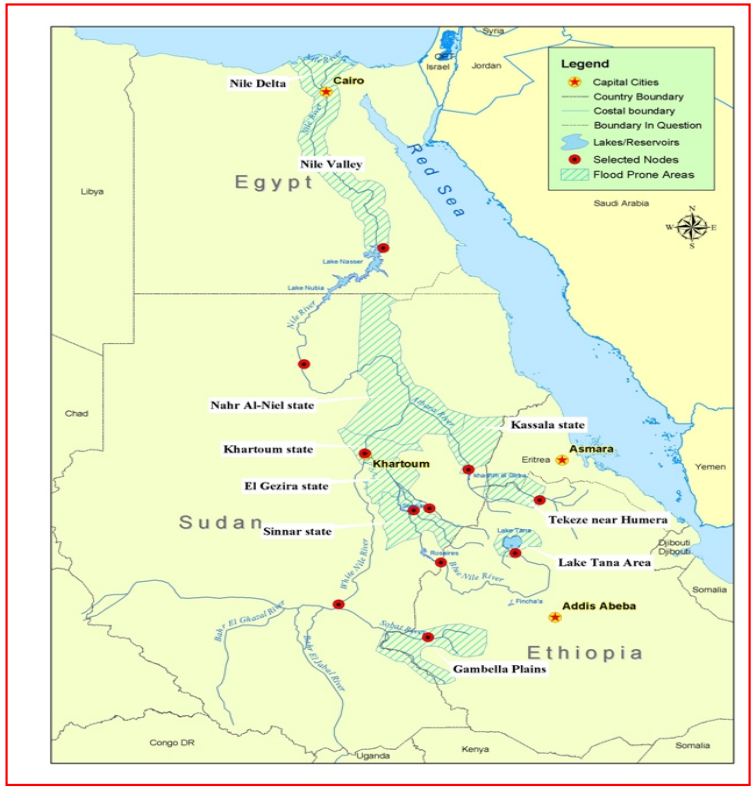
Areas Affected by Flooding

- In Sudan the Areas around the main and Blue Nile River and its tributaries are most susceptible to damages by riverine floods.
- These include states: Northern, River Nile, Khartoum, Sinnar, Jazeera and Blue Nile.
- The flash flood States: Great Kordofan, Kassala, great Darfur, White Nile and Red sea.

Flood Prone Areas in Sudan

Riverine Flood Prone Areas in Sudan





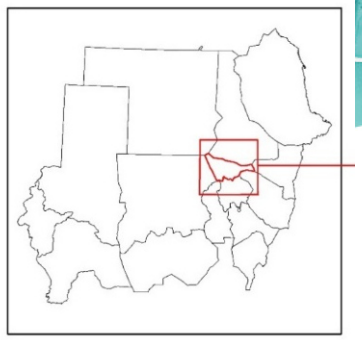
Impacts of Flood

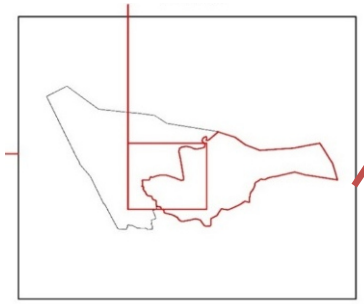
Case Study

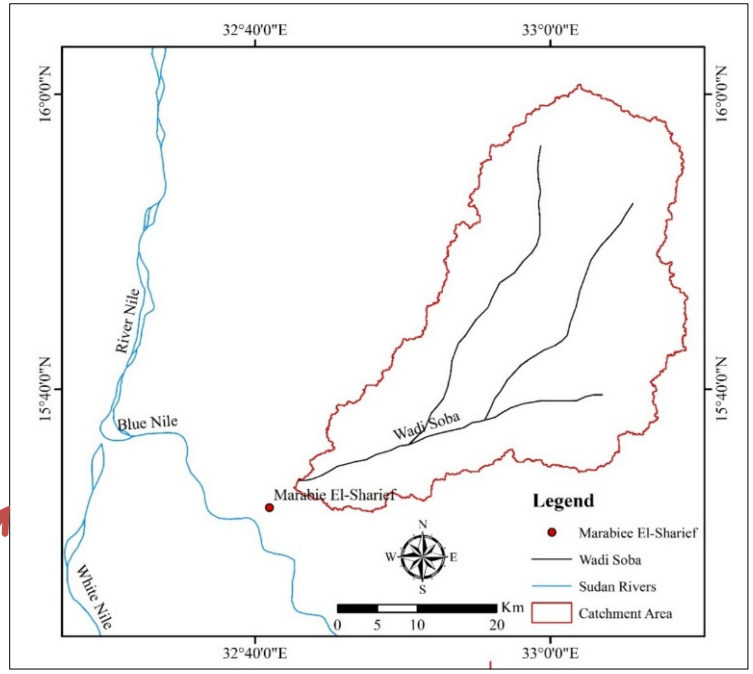
Integration of Remote Sensing and GIS for Flood Modeling (Marabiee El-Shaarief, Khartoum, Sudan)

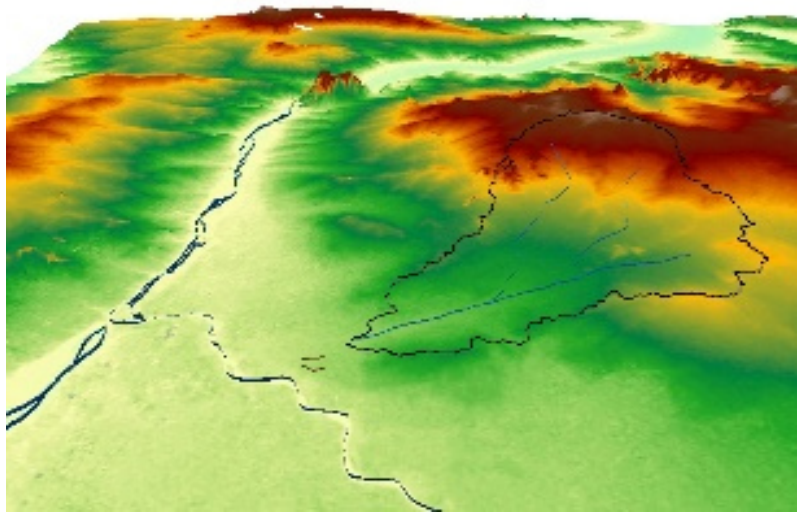
- The study was carried out in Marabiee El-Sharief area which is located in Sharq El-neel Locality in Khartoum State.
- The severe flash flood occurred in 2013.
- The site is located in a flood prone area according to the general topography, besides that, it is situated in lowland area in the middle of a water course.

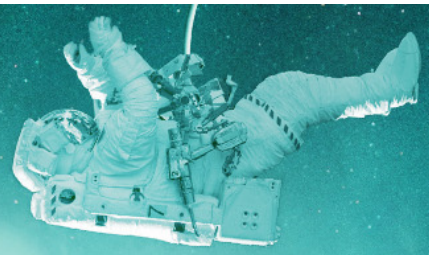
Study Area (Sharq El-neel locality)









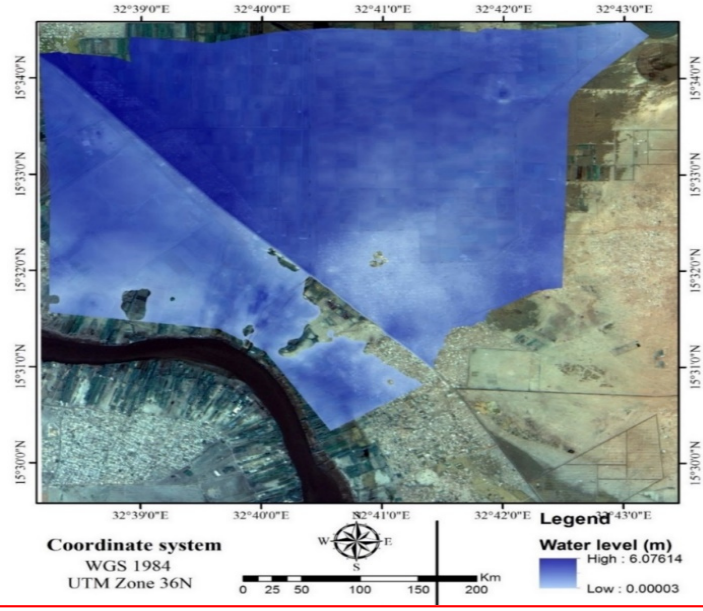


Data Sources

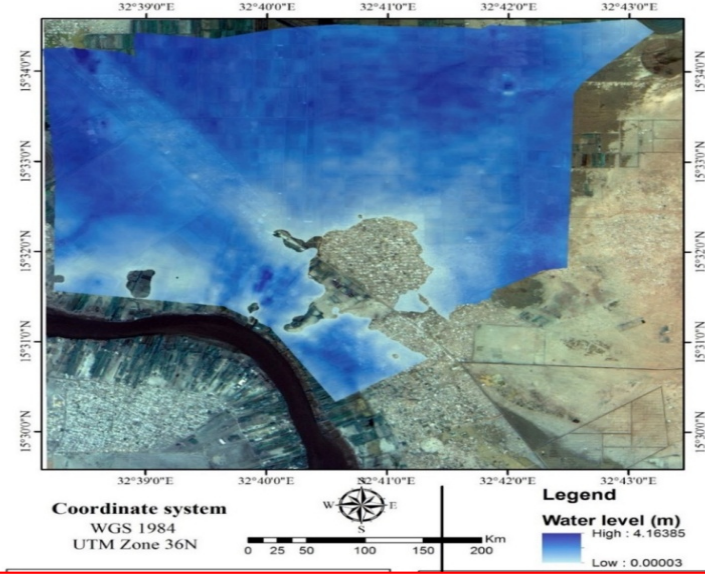
The main source of data used are:

- Remote sensing data from Formosat satellite image,
- DEM from SRTM and Digital Elevation Points,
- Rainfall data from three rain gauge stations in Sharq El-neel locality,
- Available maps,
- Past Reports,
- Data collected during field survey.

Before Flood (With Road and Canal)

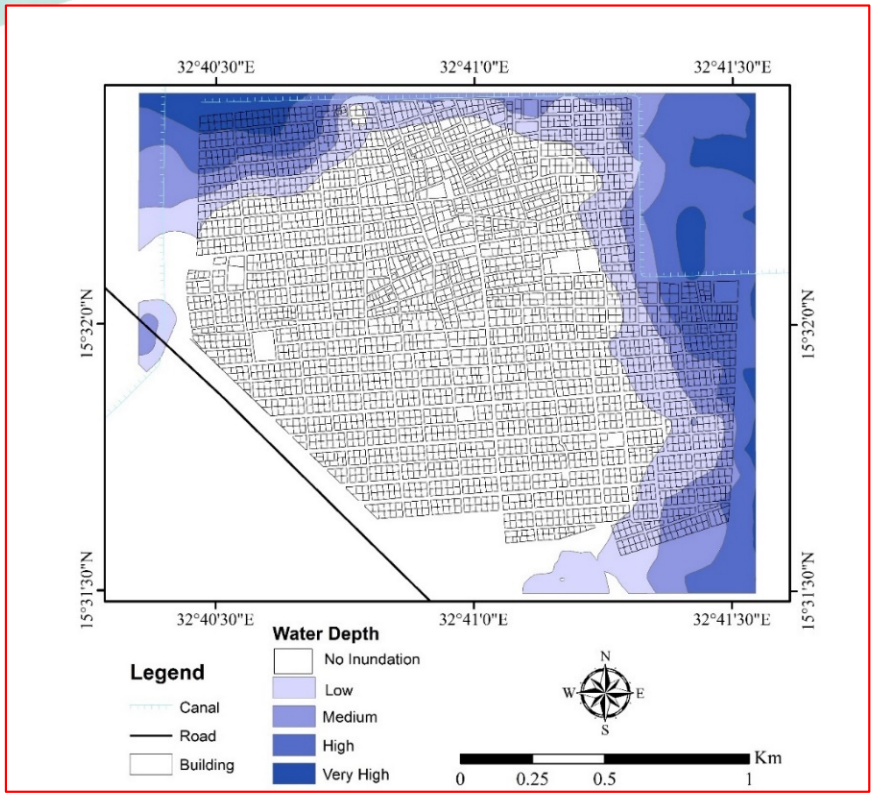


After Flood (The road is cut off)

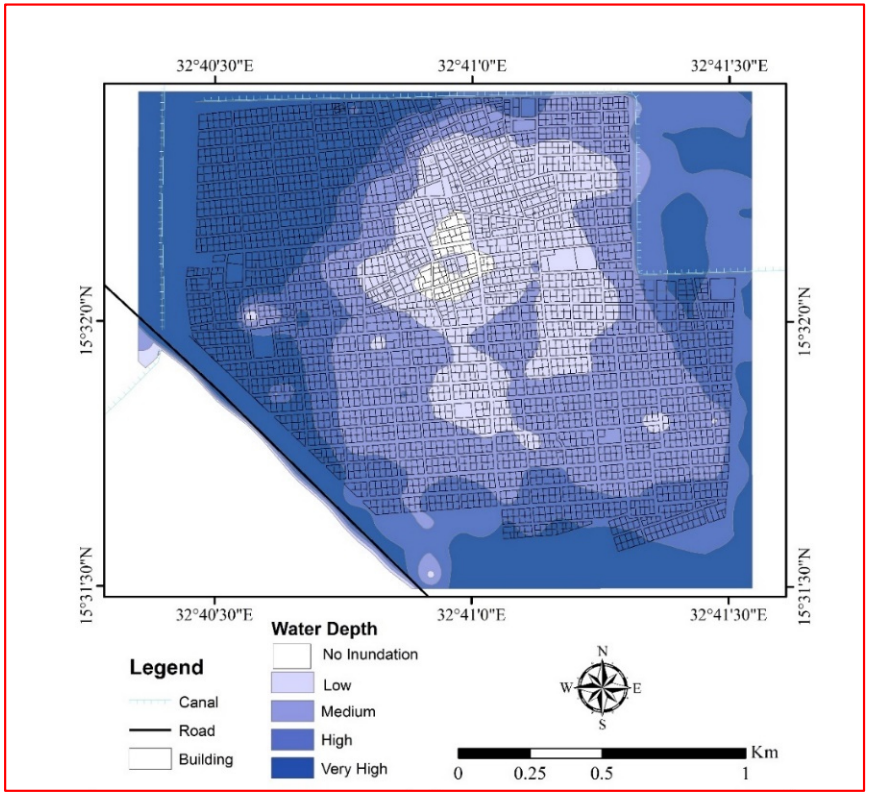


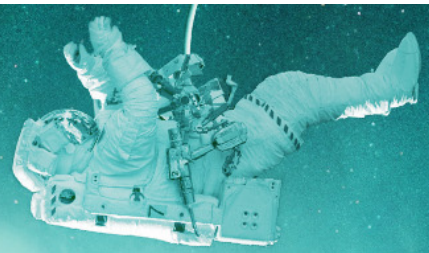
Affected Area

Water Depth before Flood



Water Depth After Flood





Conclusion

- Remote sensing is an important tool for flood monitoring.
- Satellite images provides the first impression of the areas affected by flood.
- The continuous development and launch of earth observation satellites will continue to support space-based disaster management.

THANK YOU