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# Earth observation for the protection of World Cultural and Natural Heritage

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© UNESCO / "Satellites and World Heritage sites, partners to understand climate change" exhibition

Adoption of the World Heritage Convention

# 1972

Launch of Landsat 1  
(1st civilian Earth observation satellite)

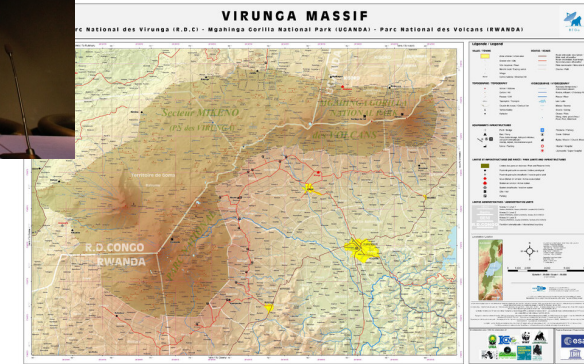


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# Earth Observation for management and conservation of World Heritage

- 1990s The first application of satellite imagery to monitor World Heritage sites.
- 2000s UNESCO “Open Initiative on the Use of Space Technologies in UNESCO sites” gets support from several space agencies (ESA, DLR, BELSPO, etc...) to support developing countries in the monitoring of World Heritage sites.
- 2010 World Heritage Committee makes a call to “examine the feasibility of using remote sensing techniques” to monitor and conserve World Heritage sites.
- 2011 Establishment of the first-of-its-kind World Heritage research and training organization based on space technologies: the International Centre on Space Technologies for Natural and Cultural Heritage (HIST) in China.
- 2015 Partnership with UNITAR-UNOSAT enabling UNESCO monitors the state of conservation of many World Heritage sites at risk due to natural hazards or conflict, including the impact of the conflict on Aleppo’s cultural heritage.



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# Earth Observation for World Heritage in times of changing climate

April 2021

Launch of the Urban Heritage Climate Observatory in collaboration with the Group on Earth Observation (GEO) to understand and document the impact of climate change on World Heritage Cities.



October 2021

First global scientific assessment of greenhouse gas emissions and sequestration by forests in UNESCO World Heritage sites based on tree cover satellite data.



2022

Cooperation with the EU Joint Research Centre through the Copernicus programme and the Digital Observatory For Protected Areas (DOPA) to bring satellite data to end-users and site managers



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# Tracking changes over time of evolution of Historic Cities

## 2.2 ຫຼວງອະນຸລັກ

ມີທັງໝົດ 183 ຫຼວງ



Source: Dept of World Heritage Luang Prabang



Example of GIS mapping and monitoring of urban wetland within the heritage Town of Luang Prabang (Lao PDR)

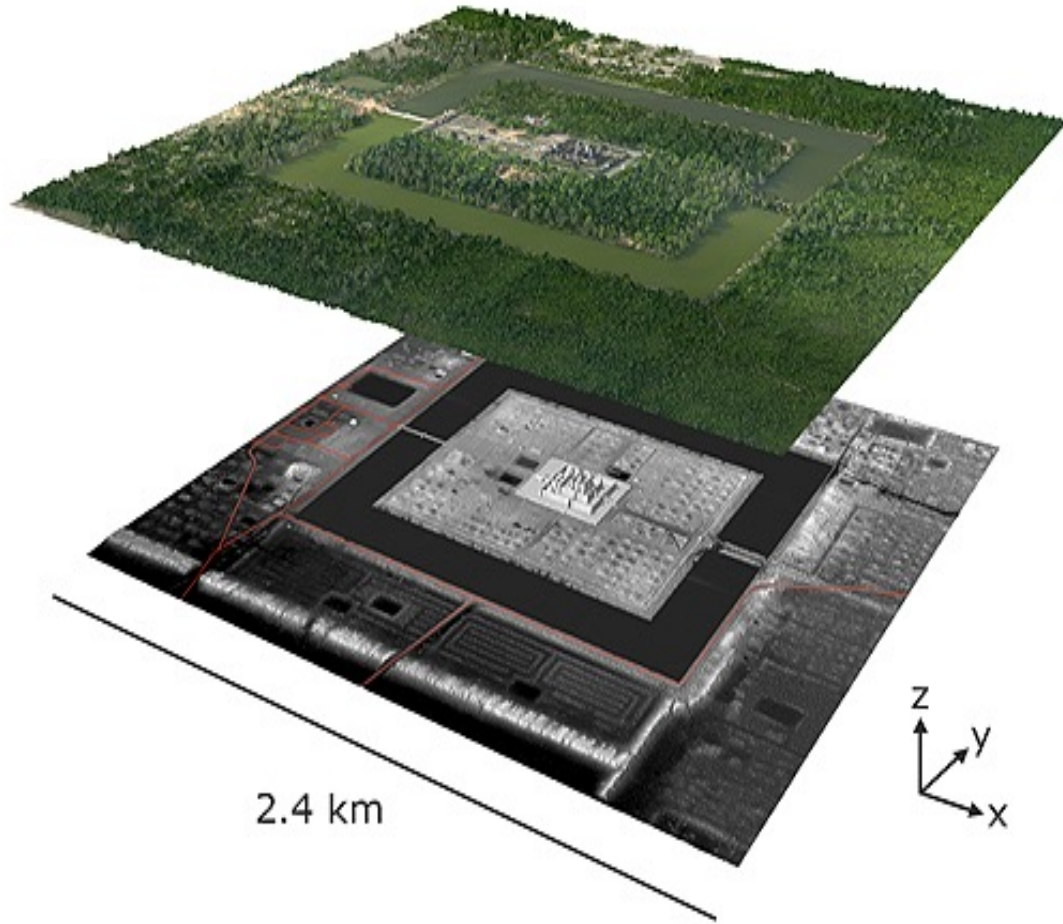
ສິ່ນແວນນ້ຳ / Alimentations hydrauliques des mares

- A ຄ່ອງນ້ຳ / Cours d'eau
- B ນ້ຳຝົນ / Eaux pluviales
- C ແຮງ / Mare en amont

ກິດຈະກຳ / Usages des mares

- 1 ປາ / Pisciculture
- 2 ວິເສາລັບຕົ້ມ / Maraichage
- 3 ວິເສາລັບສັດ / Plantes fourragères
- 4 ວິດີທິເອກ / Bassin d'ornement
- 5 ປະເມີຍ / Non exploitée

# LIDER for detecting underground archaeological structure



Angkor Thom ©les découvertes archéologiques



Aguada Fénix, Mexico ©Takeshi Inomata

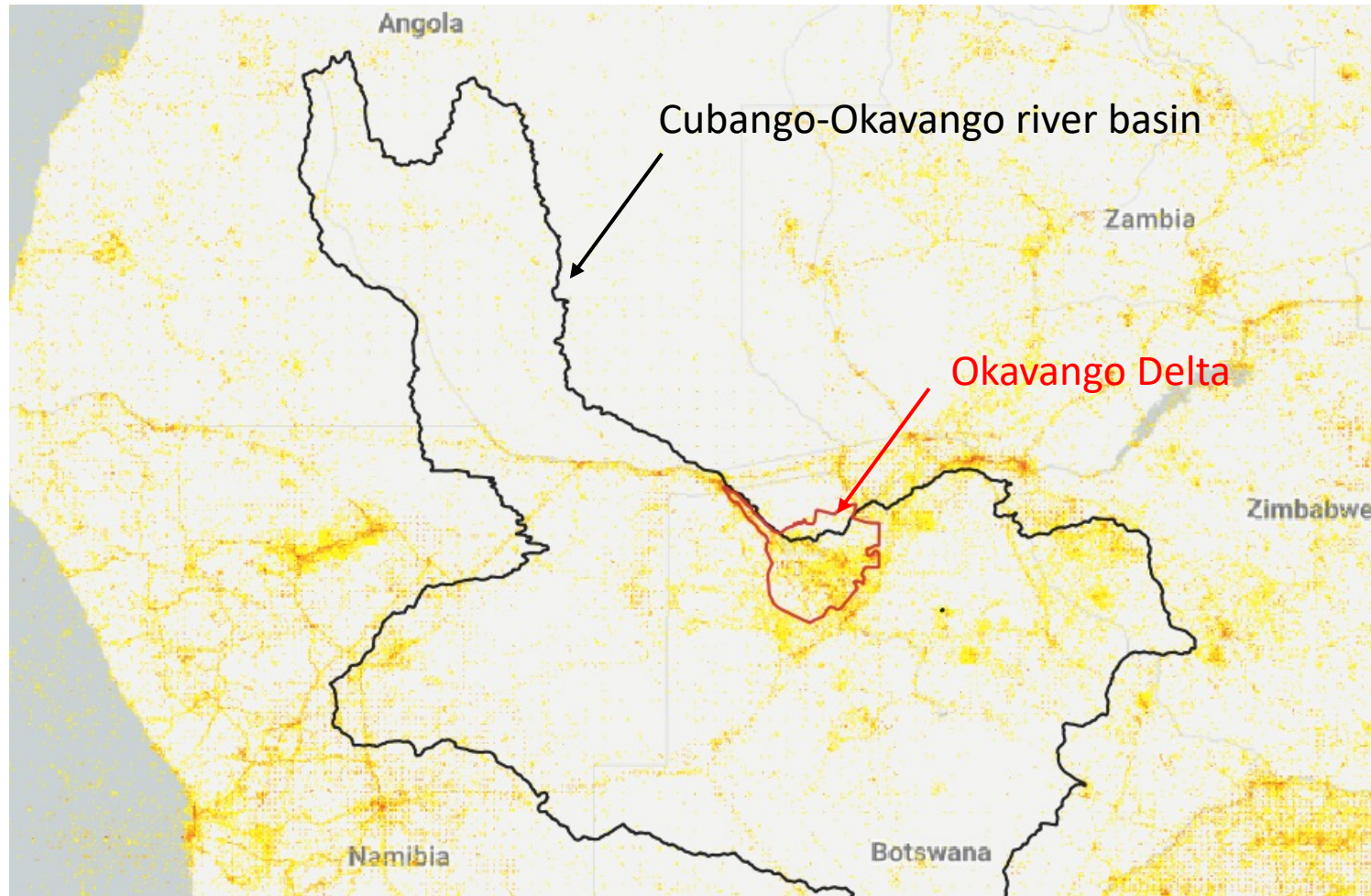
# 3D modelling of Heritage sites



World Heritage site of Minaret of Jam (Afghanistan) ©ICONEM

# Case study: Relevance of remote-sensing in the Okavango Delta World Heritage site

## Density of biodiversity data



Source: Global Biodiversity Information Facility





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# Thank you

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