

ULB

- VHRRS & OBIA
- Urban morphology and dynamics in Africa
- Population patterns in African cities
- Socioeconomic component, notably in vulnerability analysis
- Sub-Saharan Africa

UNamur

- HRRS
- Spatial epidemiology of human diseases (in particular vector-borne)
- Spatial statistical modelling
- Population distribution in Africa

REACT

UMAINE

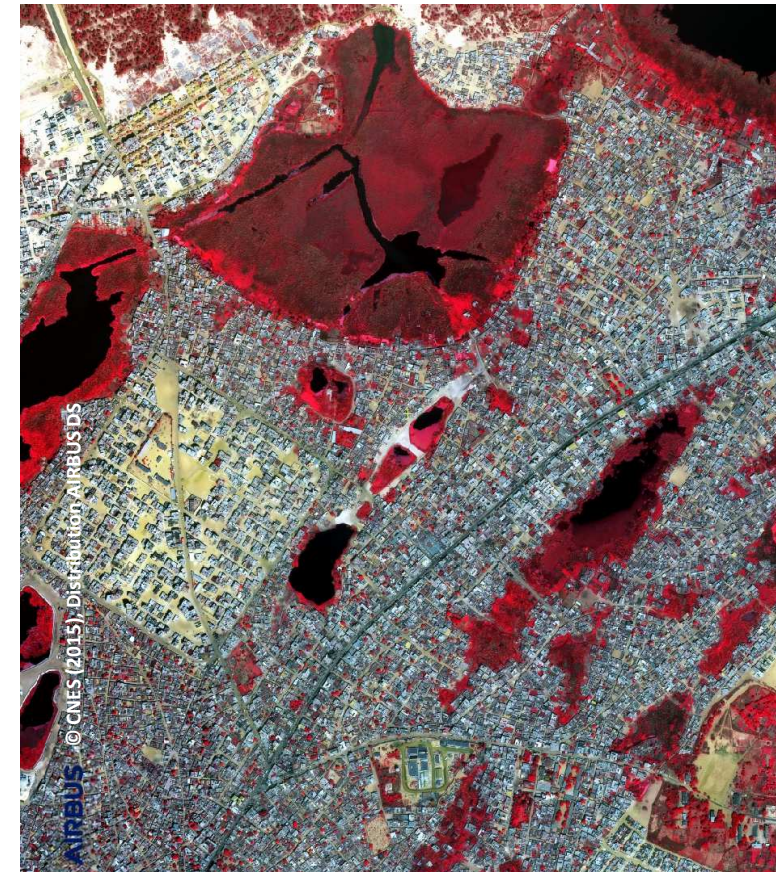
- Spatio-temporal analysis of large HR and L/MRRS time series
- Land-cover change - extraction of trends and abrupt changes
- Environmental change monitoring

KU Leuven

- Advanced HR regional urban climate models
- Land-atmosphere interaction, especially in urban areas
- African climate (e.g., Sahel, Congo basin, Great Lakes)



Remote sensing for Epidemiology in African CiTies



The Consortium

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University of Maine (UMaine) Sustainability Solutions Initiative - Senator George J. Mitchell Center for Sustainability Solutions

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<http://react.ulb.be>



Context and objectives

According to the World Health Organization (WHO), it is estimated that 90% of all malaria deaths worldwide occur in Africa. Malaria intervention across the continent remains focused on rural, highly endemic communities. Yet, urban malaria in sub-Saharan Africa is a major health problem that is likely to become increasingly important. Up to now, the heterogeneity of intra-urban malaria risk has not been captured in continental risk-mapping initiatives and the inter-urban risk variations have not been taken into account in malaria risk modelling.

The research project REACT aims to harness the potential of **remote sensing** and **spatial modelling** at different spatial and temporal scales to **improve the spatial understanding of intra- and inter-urban malaria risk variations in sub-Saharan Africa**.

Expected scientific results

- Innovative methods for deriving climatic, environmental, demographic and socioeconomic variables from very-high, high and low/medium resolution remote sensing imagery.
- Better insight into temporal and spatial variations of meteorological conditions in sub-Saharan cities.
- Better insight into environmental trends, cyclical components and rapid change events in sub-Saharan cities.
- Better insight into spatial variations of demographic and socioeconomic characteristics in sub-Saharan cities.
- Intra-urban predictions of malaria infection risk across four sub-Saharan cities.
- Better understanding of the variations of malaria infection risk between sub-Saharan cities

Methods

REACT will propose innovative methods for **extracting climatic, environmental, demographic and socioeconomic variables from very-high, high and low/medium resolution remote sensing imagery**.

An original methodology will be developed for combining remote sensing variables with **climate models** for an improved representation of urban characteristics for Africa.

The temporal dimension of summary remote sensing variables will be used to account for trends, cyclical components and rapid change events linked to **environmental conditions**.

Variables computed at the neighbourhood level will be analysed to model the **demographic and socioeconomic characteristics of the population**.

Finally, demographic and epidemiological data from surveys and this wide range of remote sensing variables, directly extracted from the imagery and output from the above models, will be used in **spatial predictive epidemiological risk models**.

Remote Sensing for Epidemiology in African CiTies

Expected outcomes

The expected outcomes of REACT are **tools and methods** for faster and less labour-intensive alternatives for **targeted and effective disease control**.



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Potential users

Potential users of the project outcomes are **policy makers** based in the local and governmental ministries of low-income countries, in support to development, health and planning policies.

Other potential stakeholders include international organizations, governmental organizations and various non-governmental organizations working in health and development.

