Job description

A PhD position is open at the Department of Geosciences, Environment and Societies (DGES) of the Université libre de Bruxelles (Belgium), in connection with the PASTECA project (Historical aerial Photographs and ArchiveS to assess Environmental Changes in Central Africa) funded by the Belgian Science Policy Office. The successful applicant will join the ANAGEO research unit led by Prof. Eléonore Wolff.

ANAGEO is a small team that carries out research in the field of man-environment interaction, with focus on the study of land use/land cover, its evolution and its determinants, using (very)-high resolution remote sensing and geospatial analysis. The research topics that are addressed revolve mainly around the monitoring of urban areas in space and time, land planning, natural resources management, population estimation, spatial epidemiology and humanitarian action.

Project description

PASTECA is a 4-year interdisciplinary project that aims to map, analyse and model the environmental changes in central Africa (tropical mountain environments of the western branch of the East African Rift) using long series of remote sensing data including historical B/W aerial photos and recent VHR satellite images. The first specific objective is to produce georeferenced digital products of the historical photographs and archives that can be used for LULC studies in general. The second specific objective is to explore the causes, impacts, scales and trends of the LULC and its changes in the context of environmental degradation with the help of these digital products. The third specific objective is dedicated to improve accessibility of digital products related to historical photographs, archives and LULC changes available for both the international scientific community and the public at large to foster their exploitation.

Research description

In PASTECA, ANAGEO will focus first on the extraction of LULC information from the historical aerial photos by computing textural, structural and/or contextual features to compensate the lack of spectral information. Recent VHR satellite images will complement the historical data set. The feature extraction will be achieved with machine learning algorithms either on pixel or on objects using an existing semi-automated OBIA processing chain (segmentation and classification). Developing additional modules for enhancing the processing chain may also be necessary, such as multi-date and/or multi-level
segmentation. For three cities, the LULC will be extracted using an automated chain for a period ranging from the 1950s until now in order to map and to analyse the LULC changes. The results will be refined by visual photo-interpretation. Secondly, the population densities will be mapped using historical censuses. Thirdly, such analysis, enlightened with historical factors, will be confronted to an inventory of earth surface processes (landslides, gully erosion marks, deforestation, ...) in order to interpret the human driving forces of land degradation and the evolution of the environmental risks. Finally, the urbanisation will be modelled in space and time in order to predict further evolutions.

Profile

We are looking for a highly motivated and enthusiastic candidate, interested in issues related to socioeconomic and environmental studies, urban development and sub-Saharan Africa.

Applicants should have completed a master’s degree in Geography, Geospatial Science, Bioengineering or a related discipline, and be skilled in remote sensing and geospatial analysis.

Coding skills in Python and R is a strong asset.

Additional expertise in the following fields is highly valuable: Object-Based Image Analysis, VHR remote sensing data processing, spatial modelling, machine learning, geo-statistical methods, data handling with PostgreSQL/PostGIS.

A very good command of English, both spoken and written, is required; the knowledge of French is clearly an asset.

Interested?

Applications should be sent directly to ewolff@ulb.ac.be (e-mail subject: “PASTECA application”).

Application should be submitted in English as a single PDF file including a cover letter, a detailed CV mentioning grades for each academic year, a list of publications and two reference letters with the details of the referees.

The interview will occur the 28th of June, if necessary by Skype.

Salary: Approximately 1850 € after tax.
Duration of the grant: 4 years full time PhD.
Starting date: presumably 1/10/2017

Deadline for the submission of applications: 1/06/2017