



PhD job opportunity

December 2014 - December 2017



University of Tours, France & Anna University, India

Upstream-downstream contamination gradient of the fluvial urban system in Chennai

PhD co-supervised by

Pr. Desmet, Director of the Continental GeoHydrosystems Laboratory (GéHCO lab)

Pr. Ambujam, Director of the Centre for Water Resources (CWR)

Water pollution of fluvial systems in urban areas is a key issue addressed to the researchers working on watershed risk assessment. The french academic GeHCO laboratory (Tours University) and the Centre for Water Resources (Anna University - Chennai) are associated for supervising a PhD dealing with the trace elements concentrations in bed sediment, suspended matter and water of the large urban rivers of the city of Chennai.

The main purpose is the characterization of sediment and water quality at different hydrological periods in order to provide a detailed understanding of sources, storages and signatures of a possible trace elements pollution.

The objectives of this PhD consists in :

- looking at existing studies in this proposed subject area
- mapping the fluvial system and tributaries
- identifying potential agricultural, industrial and urban sources of incoming pollution
- providing a protocole of sampling bed sediments and water
- analyzing sediment and water proxies
- quantifying spatial trace element concentrations
- reconstructing the assumed upstream-downstream contamination gradient
- correlating the state of polluted waters to the industrial areas and urban development.

The applicant will ideally have good analytical skills and will be familiar with sedimentological and geochemical analysis of fluvial sediments.

Requirements :

- Master's Degree in water Sciences
- experience with laboratory and/or field experiments, preferably with fluvial systems
- interest to combine laboratory and field studies, data analysis and models
- Knowledge of statistical analysis is appreciated
- willingness to work in a multidisciplinary environment

General informations

The first months of the PhD (from Dec. 2014 to Feb. 2015) will be held at the GéHCO laboratory. This period consists in a benchmarking study and an identification of the water bodies and incoming rivers and their potential geochemical signature. Field trip in Chennai and coring/sampling "party" of bed sediments is scheduled in February 2015. Next 6 months will be held at the Centre for Water Resources. During these long-term stays in France, the monthly salary is 900 euros. Each year, travel and accommodation in France are also granted. For the next two years, we will organize two visits (research scholar) of the PhD student in France.

Collaborations within the ARCUS project

Geochemical research will be supervised by Cécile Grosbois, Professor in Tours University. The recruited PhD student will be connected to the french PhD student - Karine Hochard - working on Urban planning of the City of Chennai and supervised by Laura Verdelli, Pr. in Tours University. Another PhD student - R.H.Rukkumany - is planned for water management systems of Tamil Nadu (co-supervised by Laura Verdelli in association with the school of architecture and planning at Anna University). This pluridisciplinary approach will be very helpful.

The GéHCO laboratory - University of Tours, France

Organization

Head of Unit : Pr. Marc Desmet

13 faculty members

7 PhD students

3 post-doc scientists

6 engineers & technicians

Research themes & Keywords

The GéHCO laboratory is currently involved in 12 granted research projects dedicated to the study of fluvial systems and watershed risk assessment. Research is developed according to two aspects : (i) hydrological changes and biogeochemicals processes, (ii) dynamics and sources of particles transfers.

Keywords & Areas of expertise

Watershed, fluvial system, water, soil, sediments, resources, global change, erosion, transfers, flux, pollution, river bedload, thermal regime, land use and watershed connectivity, data base and models, spatial analysis.

Some field & laboratory equipments

- Solid transport platform & Nrs Quadriraft
- Isokinetic samplers: BTMA, Delft bottle, USBM 54, Niskin bottle
- Hydrometric equipment: level, flow-rate, adcp velocity, piezometry
- ES3 odom multibeam sounder & Leica HDS 3000 3D laser scanner
- Cobra percussion corer and Uwitec piston corer
- Multiparameter probes: temperature, turbidity, oxygen, pH, conductivity
- Trimble M3 automatic withdrawers, weather stations, full station
- Thermoelectron gas chromatograph & atomic absorption spectrophotometer with flame and furnace
- Shimadzu solution and solid carbon-nitrogen analyzer
- litho-laminating bench & Carela rock splitter
- Minolta 700D Spectrocolorimeter, bartington susceptibilimeter & Malvern 300 laser grain size analyser