

## Helmholtz Centre for Environmental Research - UFZ

The Department of Catchment Hydrology is offering two positions for Master thesis to commence at the earliest convenience.

### Master Thesis 1: Climatic and landscape controls on flooding hazard of rivers

### Master Thesis 2: Use of remotely sensed data to constrain estimates of river flooding potential

A reliable assessment of the flooding hazard of river basins is crucial for many disciplines ranging from water resources management to urban planning and the insurance industry. However, the stochastic character of streamflows makes this a difficult task, particularly when long series of observed discharge data are not available. New methods promise to increase the reliability of the estimates of flood magnitude and frequency, especially in conditions of data scarcity, by exploiting a new conceptualization of hydrological processes and the information gathered through remote sensing.

The goals of these theses works are:

- identifying key climatic and landscape controls on flooding potential of river basins (thesis 1), in order to develop a tool to assess if available data series are long enough to provide reliable estimates of the underlying hazard (thesis 1);
- establishing a method to use remotely sensed data of soil moisture to constrain estimates of flood-frequency curves (thesis 2).

### Your tasks:

- Acquaint yourself with methods to estimate magnitude and frequency of floods
- Program and implement in software new mathematical findings
- Search and use of remote sensing data
- Apply models to river basins in different geographic and climatic settings
- Analyze, interpret and summarize results

## Your profile:

We are looking for motivated students interested to work on a topic at the forefront of the scientific research on floods. The following attributes ease your work, but they are not required provided you are willing to learn:

- Background in hydrology, engineering or natural sciences
- Good mathematical understanding
- Some experience in programming (e.g. Python, R, Matlab or Fortran), GIS or in using remote sensing data

## We offer:

- Great insights into the work of a leading research institute
- Individual supervision with the possibility to work independently
- A topic with high chances of future scientific outcomes (e.g. publications)
- Work in international teams in a well-equipped institute

The timing is flexible and applications are accepted any time. Please get in touch with us for further details.

## **Your contact for any questions you may have about the job:**

stefano.basso@ufz.de

## **Closing date for applications:**

open until filled.

## **Helmholtz Centre for Environmental Research - UFZ**

The Department of Catchment Hydrology is offering two positions for Bachelor thesis to commence at the earliest convenience.

**Bachelor Thesis 1: Assessment of suspended sediment transport in a remote ungauged catchment of the Peruvian Amazon**

**Bachelor Thesis 2: Hydrological study for the refurbishment of a small run-of-river hydropower plant in São Tomé e Príncipe**

Data scarcity, a widespread issue especially in developing countries, hampers the capability to characterize natural resources and size connected problems and opportunities. For example, the shortage of data on river sediment transport leads to lack of knowledge concerning mercury contamination in catchments undergoing gold mining. Then again, the low reliability of water resources estimates represents a barrier to investments in the small hydropower sector and to the achievement of the 7th Sustainable Development Goal (i.e. ensure access to affordable, reliable, sustainable and modern energy for all). The goal of these thesis works is to apply new hydrologic tools to real-world issues in data scarce regions and developing countries and to benchmark their performances against those of standard methodologies. In particular the works deal with:

- the assessment of the sediment balance of an ungauged catchment in the Peruvian Amazon (thesis 1);
- the assessment of water resources available for energy production for a small hydropower plant in São Tomé e Príncipe (thesis 2).

### **Your tasks:**

- Acquaint yourself with new methods
- Program and develop short software, search and process data through GIS
- Apply tools to a specific river basin and analyze results

## Your profile:

We are looking for motivated and enterprising students.

The following attributes ease your work, but they are not required provided you are willing to learn:

- Background in hydrology, engineering or natural sciences
- Good mathematical understanding
- Some experience in programming (e.g. Python, R, Matlab or Fortran) and/or GIS

## We offer:

- Great insights into the work of a leading research institute
- Individual supervision with the possibility to work independently
- An applied topic tackled with up-to-date tools
- Work in international teams in a well-equipped institute

The timing is flexible and applications are accepted any time. Please get in touch with us for further details.

## **Your contact for any questions you may have about the job:**

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## **Closing date for applications:**

open until filled.