Project title Uncertainties in hydrological data and models for river catchments in monsoon regions.

Project number: IMURA0152

Monash University supervisors:	Prof Ana Deletic, Dr. David McCarthy
Monash University contact:	Prof Ana Deletic;
	Email: ana.deletic@eng.monash.edu.au
	http://civil.eng.monash.edu.au/about/staff/deletic
IITB supervisors:	Prof Eldho T Iype
IITB contact:	Prof Eldho T Iype
	Email: eldho@iitb.ac.in

Research Academy theme/s
List only the research academy theme/s that is relevant to the project
1. Advanced computational engineering, simulation and manufacture
2. Infrastructure engineering
3. Clean energy
4. **Water**
5. Nanotechnology
6. Biotechnology and stem cell research

The research problem
Ecological sustainable development of major catchments in India, including the Mahanadi River basin, should embrace an integrated modelling approach. Development of cost-effective modelling tools that incorporate a realistic approach to climate change adaptation are central to effective management of river basins. Assessing uncertainty of these tools is the key challenge in the process. Although some research has been done on Total Error Framework of hydrological models of Australian rivers, there is no understanding of uncertainties in modelling of rivers in monsoon regions. This project will focus on development of such methodology for monsoon regions of India. The case study will be Mahanadi river basin. It will focus on uncertainties in data that are used in the modelling procedure, as well as on uncertainties in model structure. The proper assessment of uncertainties in hydrological models will assist decision makers and will direct researchers in future data collection and modelling efforts.

Project aims
The aim of this project is to develop a sound methodology for the assessment of uncertainties in the data and models used for prediction of hydrology in monsoon catchments. The case study will be Mahanadi River basin. The objectives are:
1. Select several rainfall/runoff models that could be applied to the basin.
2. Investigate uncertainties in the available data that are needed to run the models.
3. Conduct Total Error Uncertainty analyse of the selected models.
4. Develop the best framework for assessing hydrology in Mahanadi river basins, taking into account all sources of uncertainties.
5. Conduct preliminary evaluation of the impacts of uncertainties due to climate change on the selected Mahanadi River basin model.

Expected outcomes

The final deliverable output of this project is a robust and generalised methodology for the assessment of uncertainties in rainfall/runoff models for monsoon conditions. There are three key outcomes from this project, as explained below.

1. Improved Total Error Framework methodology that can be used for hydrological modelling in monsoon regions.

2. Quantified uncertainties in a number of hydrological models for monsoon regions.

3. Practical tool for modelling of Mahanadi river basin with clear understanding of its uncertainties.

Which of the above Theme does this project address?
The project mainly deals with **water** related issues.

How will the project address the Goals of the above Themes?
The project will bring highly needed improvements in catchment management in India. In particular the tool will support sound management of Mahanadi River basin. More importantly, the developed framework could be adopted across India for other similar basins.