

**Imperial College
London**



HYDROLOGICAL MODELLING OF SOUTH AMERICA HEADWATER CATCHMENTS WITH JULES

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OUR PROJECTS

Imperial College London

- Parameterizing the JULES land surface model for different land covers in the tropical Andes.

Hsi-Kai Chou, Simon Moulds, Boris F. Ochoa-Tocachi, Wouter Buytaert

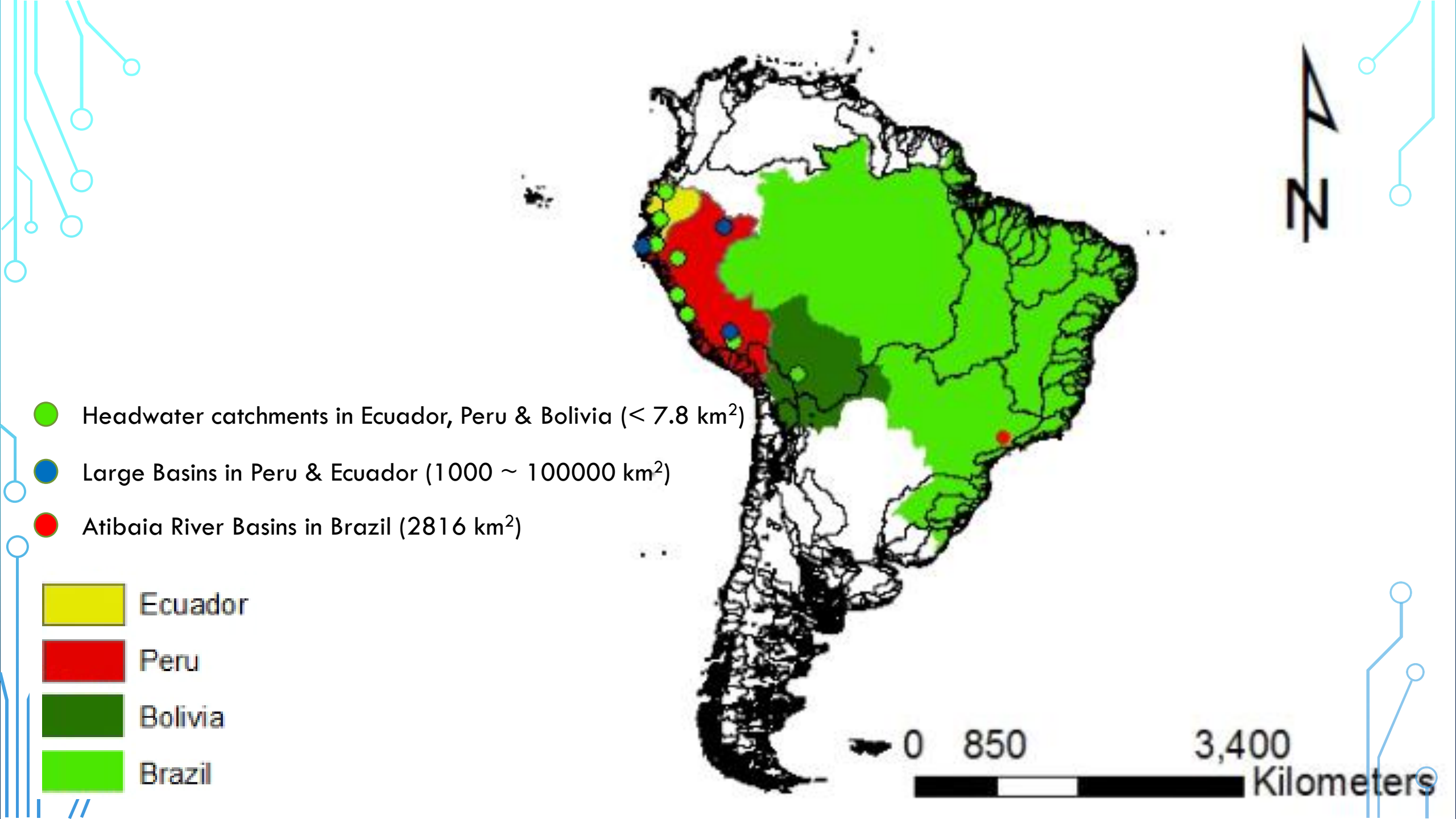
- The impact of mining and El Niño on drought dynamics of Lake Poopó in Bolivia.

Charles Zogheib , Simon Moulds, Wouter Buytaert

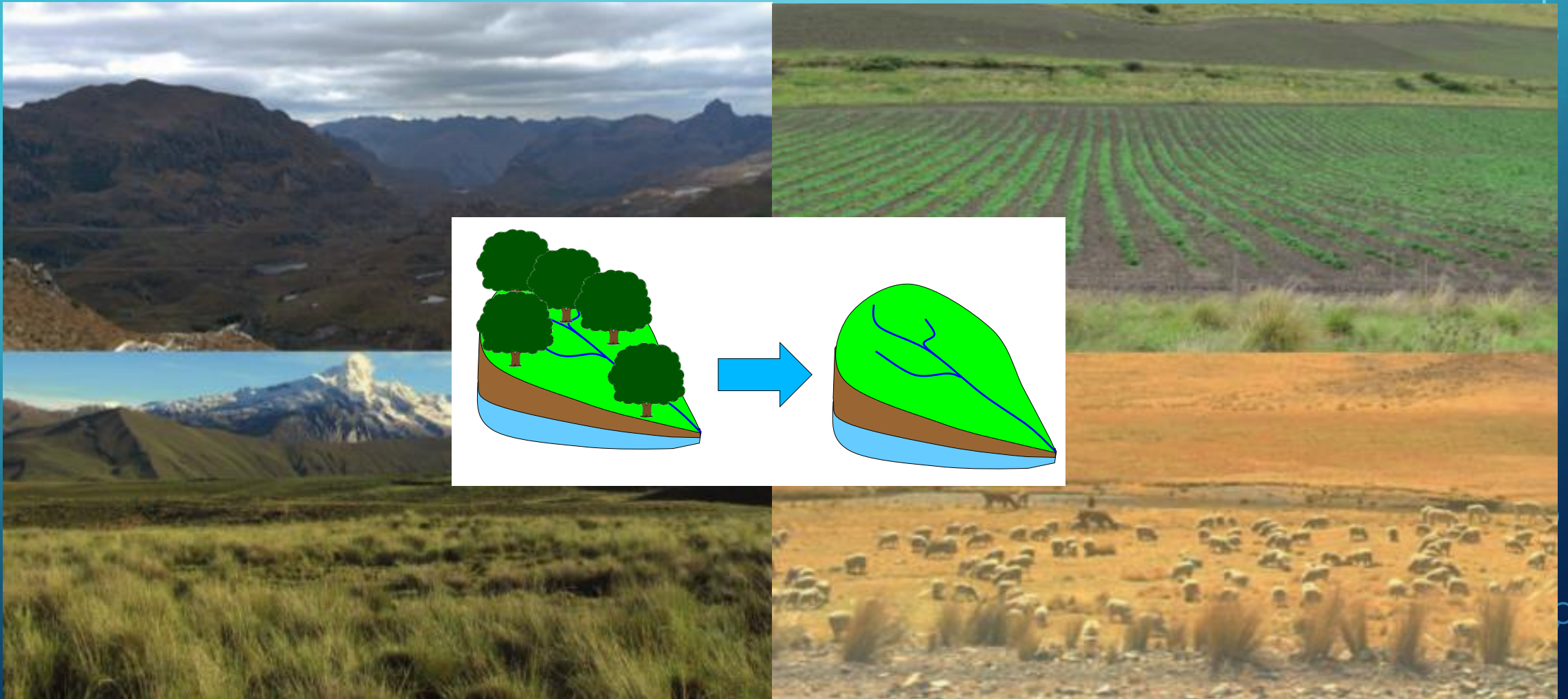
Cardiff University & University of Campinas

- Evaluating the Atibaia river hydrology using the JULES land-surface model.

Hsi-Kai Chou, Ana Maria Heuminski de Avila, Michaela Bray

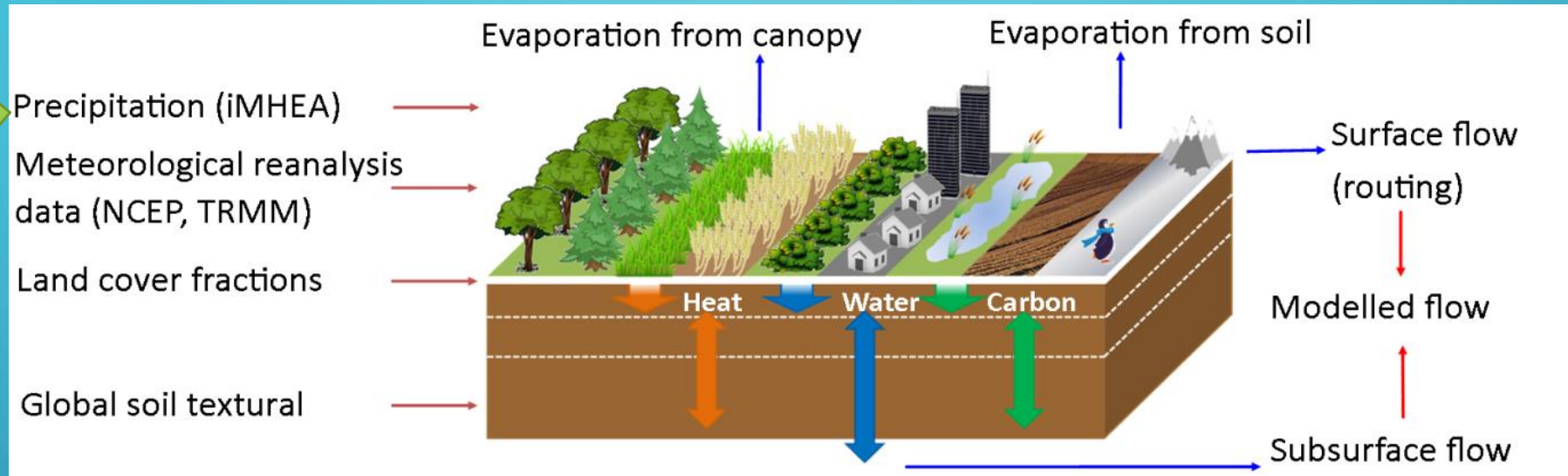


ASSESSING THE HYDROLOGY UNDER LAND USE IMPACT



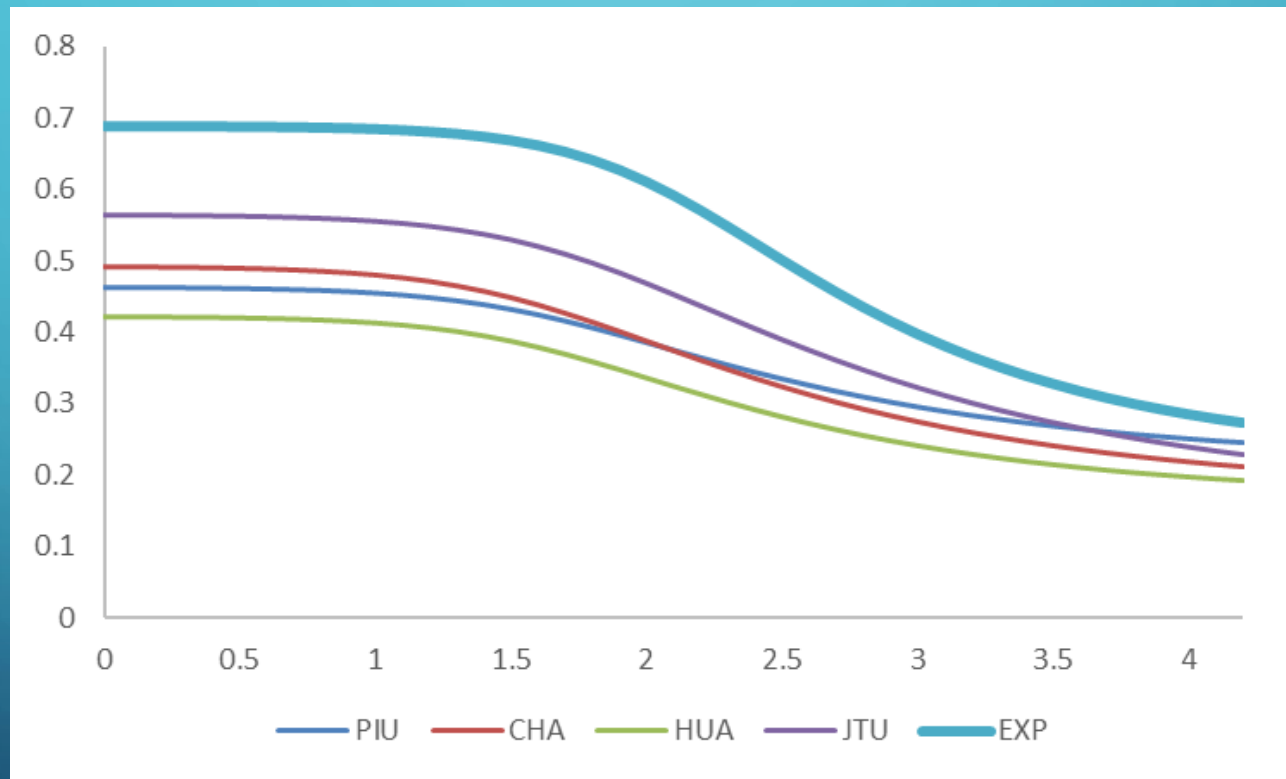
Major type of land use changes: Grazing, pine plantation, cultivation

PARAMETERIZING THE JULES LAND SURFACE MODEL FOR DIFFERENT LAND COVERS IN THE TROPICAL ANDES



Research focus:

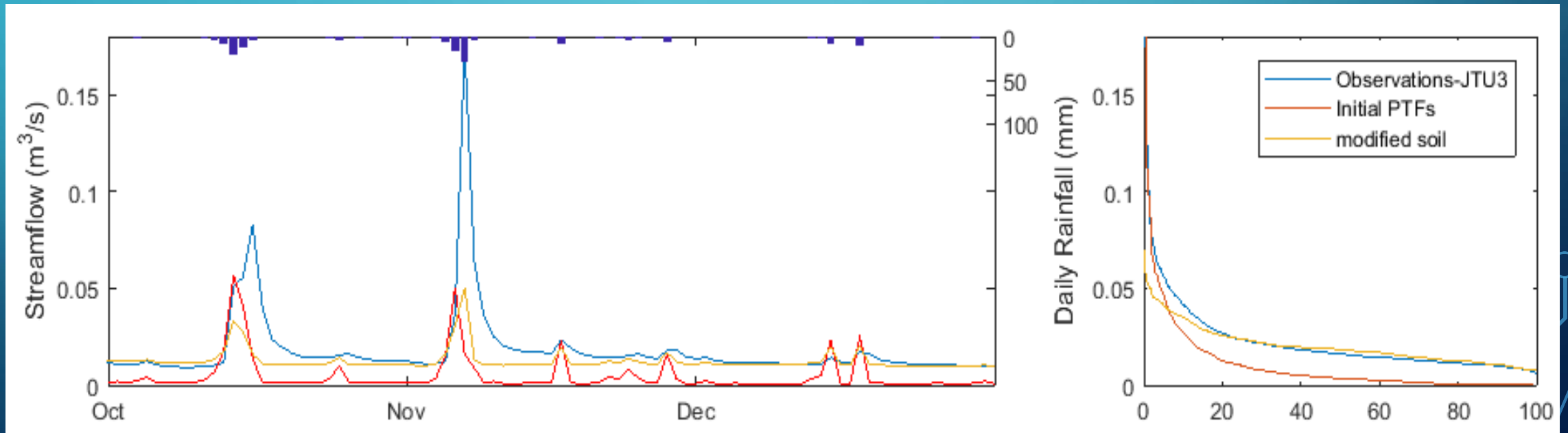
- Using the JULES land surface model to simulate local hydrology.
- Evaluating the JULES model with PTFs (Cosby et al., 1984; Hodnett & Tomasella, 2002)/ experimental soil dataset (FONAG, 2017).



Water retention curves obtained from PTFs estimation (PIU, CHA, HUA, JTU) and in-situ investigations in the JTU catchment (EXP) (FONAG, 2017)

Scientific contribution:

- Setting the JULES model to simulate the Andean hydrology in selected sites.
- Participatory collected data (iMHEA) considerably improved the model performance.
- The soil water retention parameters from local experimental data better represents local hydrology, especially in base flow generation.

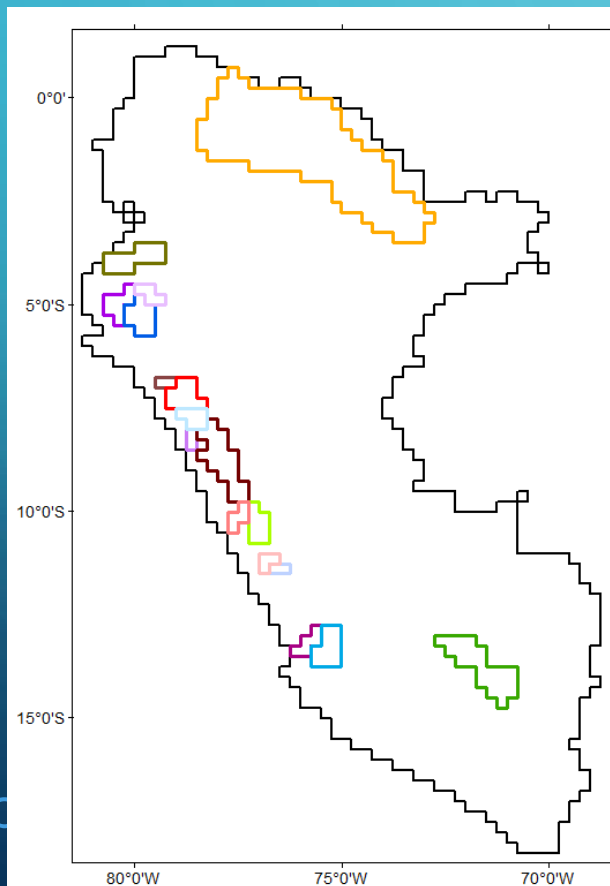


Modelling, observations, and flow duration curve in JTU3 (Ecuador)

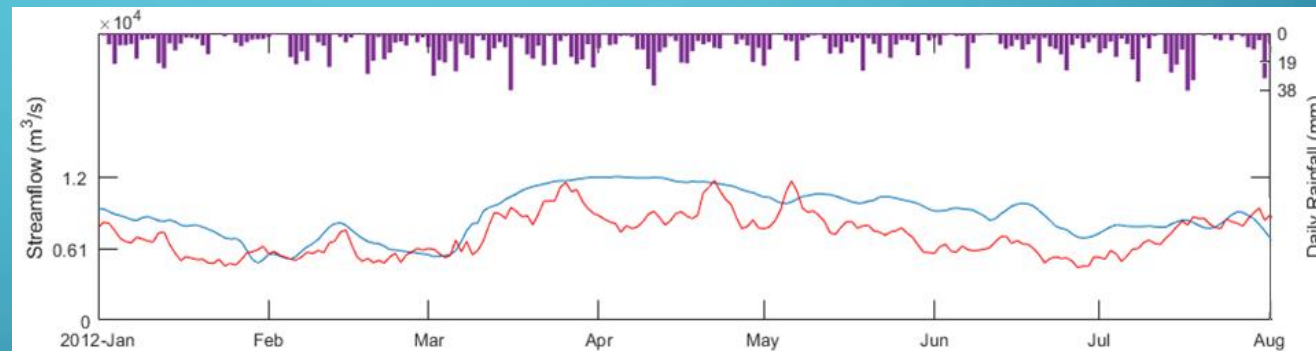
HYDROLOGICAL MODELLING ON LARGE BASINS

➤ Scientific contribution:

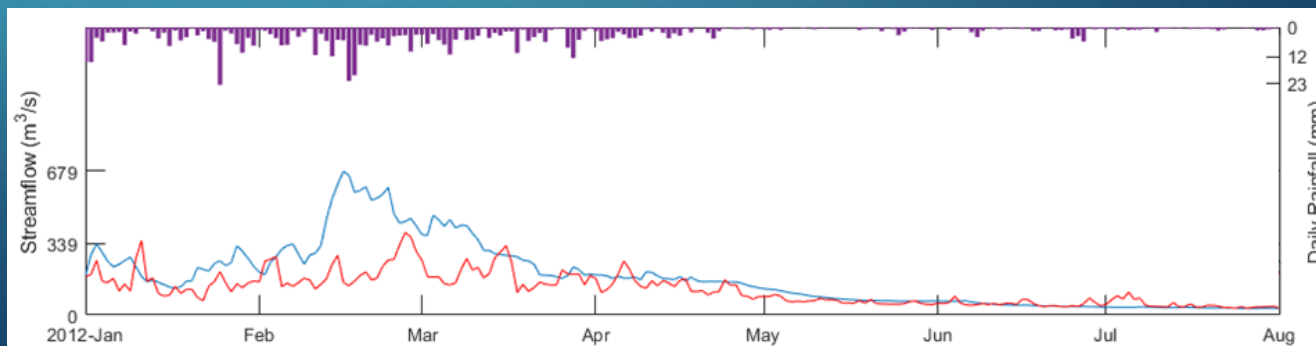
- Setting up a ready-to-use model for hydrological assessment in the Andes of Ecuador and Peru.



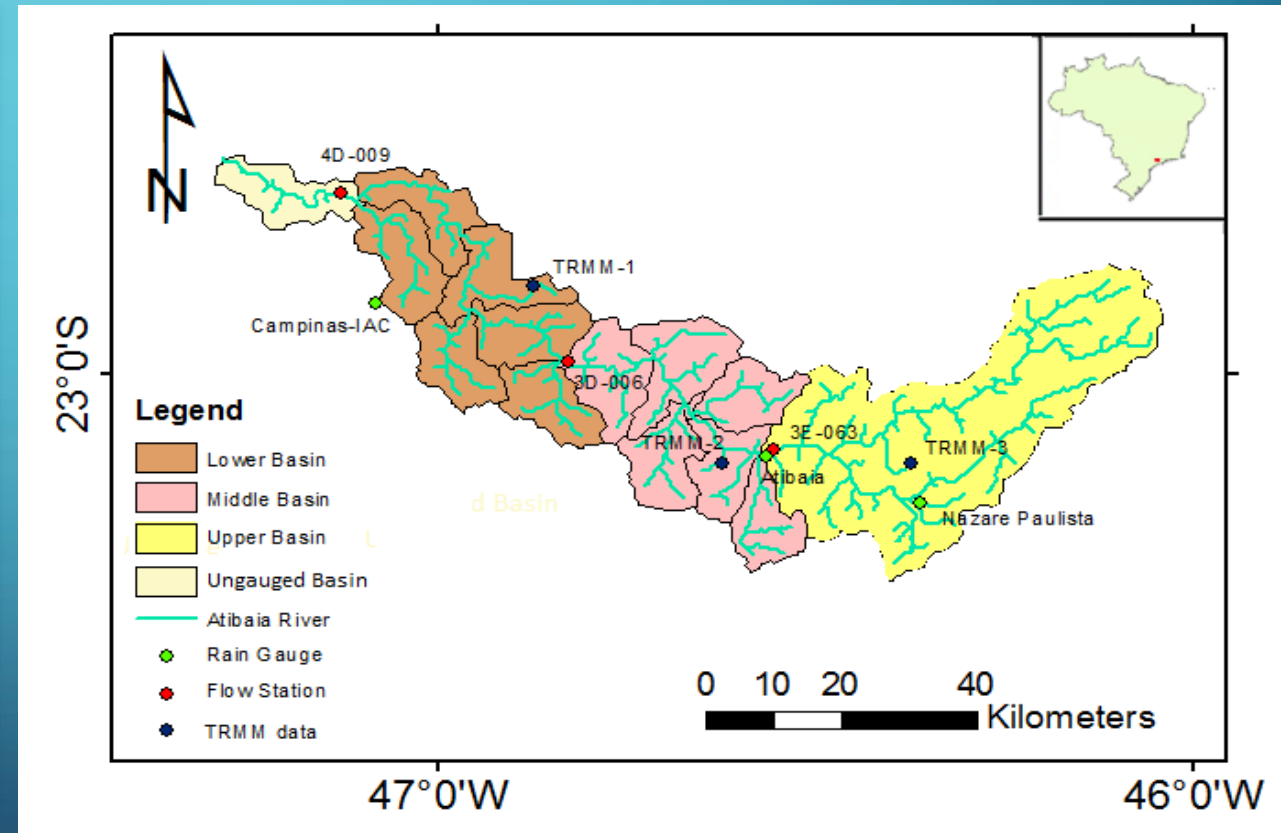
BELLAVISTA



EGEMSA KM 105

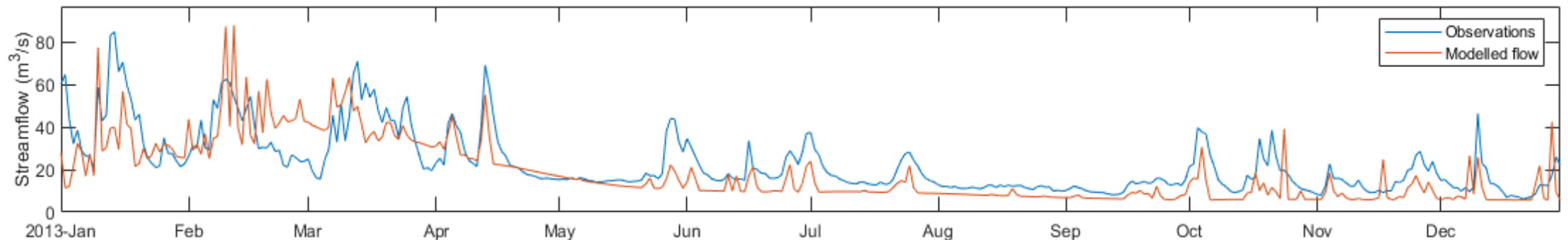
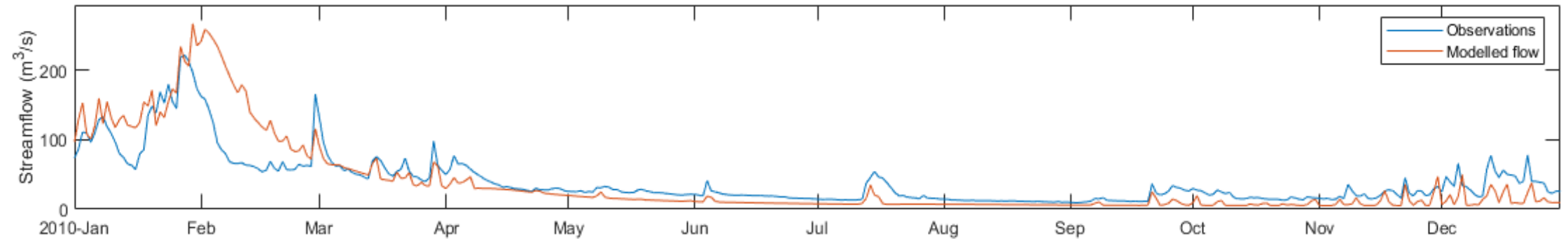


EVALUATING THE ATIBAIA RIVER HYDROLOGY USING THE JULES LAND-SURFACE MODEL



EVALUATING THE ATIBAIA RIVER HYDROLOGY USING THE JULES LAND-SURFACE MODEL

- Reasonably models the flow.
- Improvement points: reliable rainfall, soil data, and flow observations.



Modelling flow and observations in the Atibaia River Basin.

CHALLENGES IN THE FUTURE

- Uncertainty of meteorological data (coarse resolutions)
- In-situ soil experimental data (coarse resolutions)
- The soil-vegetation interaction in the JULES model
- Extending the JULES hydrological modelling to wider range of environments

Thank you for your attention and participation

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