

MONITORING WATER AND ENERGY CYCLES AT CLIMATE SCALE IN THE THIRD POLE ENVIRONMENT (CLIMATE-TPE)

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List of Principal Investigators (PIs)

Topic Nr.	PIs	Title
32070_1	Prof. Bob Su, Prof. Jun Wen	WP1: Observation and modelling of microwave scattering and emission under complex terrains and including permafrost and freeze and thawing
32070_2	Prof. Maria Jose Polo, Prof. Yaoming Ma	WP2: Advancement of physical understanding and quantification of changes of water and energy budgets in TPE
32070_3	Prof. Alexander Loew, Prof. Yaoming Ma	WP3: Advancement of quantifying changes in surface characteristics and monsoon interactions

EXECUTIVE SUMMARY

The Third Pole Environment centered on the Tibetan plateau and the Himalayas feeds Asia's largest rivers which provide water to 1.5 billion people across ten countries. Due to its high elevation, TPE plays a significant role in global atmospheric circulation and is highly sensitive to climate change. Intensive exchanges of water and energy fluxes take place between the Asian monsoon, the plateau land surface (lakes, glaciers, snow and permafrost) and the plateau atmosphere at various temporal and spatial scales, but a fundamental understanding of the details of the coupling is lacking especially at the climate scale. Thus the objective of this CLIMATE-TPE project is: To improve the understanding of the interactions between the Asian monsoon, the plateau surface (including its permafrost and lakes) and the Tibetan plateau atmosphere in terms of water and energy budgets in order to assess and understand the causes of changes in cryosphere and hydrosphere in relation to changes of plateau atmosphere in the Asian monsoon system and to predict the possible changes in water resources in the Third Pole Environment. A core innovation of the project is to verify or falsify recent hypotheses (e.g. links between plateau heating and monsoon circulation, snow cover and monsoon strength, soil moisture and timing of monsoon) and projections of the changes of glaciers and permafrost in relation to surface and tropospheric heatings on the Tibetan plateau as precursors of monsoon pattern changes and glaciers retreat, and their impacts on water resources in South East Asia. Method: We will use earth observation, in-situ measurements and modelling to advance process understanding relevant to monsoon scale predictions, and improve and develop coupled regional scale hydroclimatic models to explain different physical links and scenarios that cannot be observed directly. Deliverables: The deliverables will be scientific outputs in terms of peer reviewed journal publications, PhD theses and data sets in terms of novel data records of essential climate variables for quantification of water and energy cycle dynamics in the Third Pole Environment. Funding: The sub-projects described in the work packages will be performed by funded research projects by PhD and postdoc researchers of the participating partners.

ABSTRACT 32070_1: “WP1: Observation and modelling of microwave scattering and emission under complex terrains and including permafrost and freeze and thawing”

European Principal Investigator Prof. Bob Su University of Twente, Faculty for Geo-Information Science and Earth Observation (ITC), Netherlands	Chinese Principal Investigator Prof. Jun Wen Cold and Arid Regions Environmental and Engineering Research Institute, Chinese Academy of Sciences, CHINA
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Method: We will use earth observation, in-situ measurements and modelling to advance process understanding relevant to monsoon scale predictions, and improve and develop coupled regional scale hydroclimatic models to explain different physical links and scenarios that cannot be observed directly.

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Funding: The sub-projects described in the work packages will be performed by funded research projects by PhD and postdoc researchers of the participating partners.

ABSTRACT 32070_2: “WP2: Advancement of physical understanding and quantification of changes of water and energy budgets in TPE”

European Principal Investigator

Prof. Maria Jose Polo
 Andalusian Institute for Earth System Research,
 University of Córdoba, Spain

Chinese Principal Investigator

Prof. Yaoming Ma
 Institute of Tibetan Plateau Research, Chinese
 Academy of Sciences, CHINA

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Deliverables: The deliverables will be scientific outputs in terms of peer reviewed journal publications, PhD theses and data sets in terms of novel data records of essential climate variables for quantification of water and energy cycle dynamics in the Third Pole Environment.

Funding: The sub-projects described in the work packages will be performed by funded research projects by PhD and postdoc researchers of the participating partners.

ABSTRACT 32070_3: “WP3: Advancement of quantifying changes in surface characteristics and monsoon interactions”

European Principal Investigator

Prof. Alexander Loew
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Chinese Principal Investigator

Prof. Yaoming Ma
Institute of Tibetan Plateau Research, Chinese
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Funding: The sub-projects described in the work packages will be performed by funded research projects by PhD and postdoc researchers of the participating partners.