



Science for Solutions decade: **HELPING**
Hydrology Engaging Local People IN one **Global** world
IAHS Scientific Decade 2023-2032
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Details of the Working Group – Decomposing Complexity

Describe the work and how your suggested working group will contribute to the goal(s): The climate is a complex dynamical system involving interactions and feedbacks among different processes at multiple temporal and spatial scales. Although numerous studies have attempted to understand the climate system, nonetheless, the studies investigating the multiscale characteristics of the climate are scarce. Further, the present set of techniques are limited in their ability to unravel the multi-scale variability of the climate system. It is completely plausible that extreme events and abrupt transitions, which are of great interest to climate community, are resultant of interactions among processes operating at multi-scale. For instance, storms, weather patterns, seasonal irregularities such as El Niño, floods and droughts, and decades-long climate variations can be better understood and even predicted by quantifying their multi-scale dynamics. Our working group “Decomposing Complexity” shall contribute to methodological advancement and process understanding by unravelling the interaction and patterns of climatic processes at different scales.

Describe the methods you will use to achieve the goal(s): “Decomposing Complexity” working group shall no restrict to few methods or models. We shall offer solution for various complex processes. However, majorly we shall focus on Wavelet and complex network-based approaches. In addition, for better understanding the association, event synchronization, event coincidence analysis, edit-distance, coherence methods shall be explored.

Describe the (a) short-term, (b) the long-term and (c) the ultimate results you hope to achieve:

- (a) Short-Term-Methodological advancement
- (b) Long-term and-process understanding
- (c) Ultimate results- Societal relevance by Impact-based forecasting

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