

On nonstationarity, hydrologic modelling, and the role data assimilation can play

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Hydrological modelling is often constrained by the need to assume a model form, and limited in catchments where responses change with time. Such catchments include those undergoing deforestation or reforestation, impacted by bushfire and recovering with time, or where explicit mechanisms for change are not obvious. There is a need to develop alternatives for dynamic hydrologic models without making substantial structural assumptions that may be difficult to justify.

Here a data assimilation based approach for dynamic hydrologic modeling is presented. It attempts to ascertain when the model needs to be dynamic, what is the dynamic change needed to be built into the model, and how this dynamic model could be used for prediction and forecasting. The approach is formulated without making significant assumptions about the nonstationarity the model needs to exhibit. An overview of the approach, its limitations and some recently published applications (below) are presented.

References

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