Identifying Gaps Between Satellite Measurement Capability and Decision-making in Water Resource Management –A Case Study from Australia

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Over the past 50-years, satellite observing systems have become more stable and satellite sensors have become fundamental tools for observing, understanding and managing the Earth’ s environment. While attempts to improve data accuracy continue, expectations of satellite missions have been shifting from achieving stable measurements to exploring more complex scientific questions and wider areas of operational applications. One such area is water resource management, since the monitoring of water at both the local and global scales is essential in enabling improved decision-making. As such, the aim of this study is to investigate the needs of decision-makers in water resource management and identify the gaps between these needs and the capability of current satellites. To better understand this, we investigated to what extent satellite data is used within national and local government organisations responsible for establishing water policies and how those policies are implemented by water authorities. Australia was chosen as a case study as it is widely known as a country that is influenced significantly by climate variability and has experienced severe drought, cyclones, flooding and bushfires. The needs of the decision-makers were collected through online surveys and interviews from national and state water resource management sectors across New South Wales, Victoria, Queensland and the Australian Capital Territory, where 80% of the Australian population are governed. For each satellite measurement related to water management, the following five satellite specifications were investigated in particular: (1) *spatial resolution*; (2) *temporal resolution*; (3) *latency*; (4) *continuity*; and (5) *accuracy*. The response data collected was evaluated to understand and quantify the gaps between end-user needs and the capability of current satellites to identify specific areas of improvements in satellite development. For example, whether improvements require in sensors and algorithm development for resolution improvements, or in the ground-based facilities for prompt distribution, or even in national satellite planning to secure observation continuity. The quantitative evaluation and recommendations proposed in this study offer insights for future satellite development and planning in order to bridge the gaps between decision-makers and the products obtained from satellite missions.

Keywords: Satellite, Water Resource Management, Decision-making

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