

Snow Satellite Mission Concept Considerations, Key Questions, and Needed Tools

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ABSTRACT

In the recent Earth Science Decadal Survey, the Water Panel expressed, as an overarching goal, an integrated system of global water cycle-related observations and models. Such a system would provide a better picture of the global state of the water cycle (storage terms as well as fluxes), enabling advancements in science and applications. Seasonal snow (specifically snow depth and/or water equivalent) is listed in the Explorer category of 7 important future measurements (not all of which are water-related) because it was seen as a critical quantity where improvement is needed as well as quantity for which observing options were rated as being “mature enough”.

“Global” products of seasonal snow, however, already exist, and certain satellite observations already exist. So, any viable snow mission concept must improve upon the existing products. And, while many observing techniques are sensitive to snow depth and/or to SWE, all have limitations. There are a variety of science targets for a future snow satellite mission, and perhaps a wider range of target applications. How to assess the gap between what current snow products provide and the needs to address desired science or applications, and to compare that with what observation and model capabilities might be able to provide is the topic of this paper. We will present recent thoughts on how to make the above gap assessments, how to compare the gaps to observation and model capabilities, and we will describe some of the tools that will be needed along this road to help define and guide a snow mission concept.

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