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Multi-Satellite and Sensor Derived Trends and Variation of Snow Water Equivalent on the High-Latitudes of the Northern Hemisphere

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Author(s)

Reginald R. Muskett

ABSTRACT

Utilizing more than 30 years of satellite-microwave sensor derived snow water equivalent data on the high-latitudes of the northern hemisphere we investigate regional trends and variations relative to elevation. On the low-elevation tundra regions encircling the Arctic we find high statistically significant trends of snow water equivalent. Across the high Arctic Siberia and Far East Russia through North America and northern Greenland we find increasing trends of snow water equivalent with local region variations in strength. Yet across the high Arctic of western Russia through Norway we find decreasing trends of snow water equivalent of varying strength. Power density spectra identify significant power at quasi-biennial and associated lunar nodal cycles. These cycles of the upper atmosphere circulation, ENSO and ocean circulation perturbations from tides forms the causative linkage between increasing snow water equivalent on low-elevation tundra landscapes and decreasing coastal sea ice cover as part of the Arctic system energy and mass cycles.

KEYWORDS

Arctic; Snow Water Equivalent; Multi-Satellite; Microwave; Trends and Variations

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