Middle East Snow Cover Variability and Associated Atmospheric and Hydrologic Conditions

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ABSTRACT

The Middle East is a region historically sensitive to climate variability and change and contains snowpacks that are important inputs to key regional water resources, including the Tigris-Euphrates river system. This presentation will examine the annual, interannual and decadal variability of the region’s snowpack, and explore relationships between snow and associated atmospheric and hydrologic conditions. The presentation draws on satellite-based products, station data, and model reanalyses. Variation is summarized using space-time statistical techniques, as well as simpler regional indices, including Northwestern Iran / Southern Caucasus (NWIC, includes Zagros Mountains) and Eastern Turkey (ETKY, includes Taurus Mountains). The NOAA Interactive Multisensor Snow and Ice Mapping System tracks daily snow cover extent at 24 km resolution for 1999-present (primarily from visible satellite imagery). These data show that for both NWIC and ETKY, the mean snow extent peaks in late January with substantial coverage (~300,000 km² in each region), contracting to near zero by late June. A very large mid-winter interannual variance is also shown, implying substantial variation in hydrologic impacts during spring melt. Variability and decadal trends are compared with station snow depth reports (Global Historical Climatology Network – Daily). Strong agreement gives confidence in data quality, as well as, indicating high covariation of depth and extent. Connections with atmospheric variations and hydrologic impacts are recognized using reanalysis products and will be discussed as part of this presentation.

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