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The Drought Interest Group: Seasonal forecasts of vegetation over Central-Southwest Asia

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For both climatic and economic reasons, the region is severely impacted by drought and information about water availability and agricultural impacts is critical. In much of Central-Southwest Asia, precipitation primarily occurs in the cold season, falling mostly as the snow in the high mountain regions. The resulting spring melt is a primary driver of warm season river flows and soil moisture in the region. As a result of the seasonality, there is considerable potential predictability of warm season hydrology based on the snow pack. Unfortunately, the snow pack in this region is not sufficiently well-observed to estimate snow water equivalent. However, the water equivalent can be inferred with good accuracy from the available large-scale precipitation and wind data, and this association has been previously used to make skillful seasonal forecasts of warm season river flows. Here, we apply the river flow forecasting methodology to vegetation, in terms of the Normalized Difference Vegetation Index (NDVI) satellite estimate. Canonical Correlation Analysis (CCA) is used to extract the leading patterns between growing season NDVI and the winds and precipitation during the preceding winter and early spring. The approach is quite successful, with NDVI correlations even at 8km resolution exceeding 0.9. An analysis of the correlations stratified by vegetation type and cropping method is also provided.