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Title: Extreme precipitation event over North China in August 2010: observations, monthly forecasting, and link to intra-seasonal variability wave-trains across Eurasia
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Abstract:
Forecast of regional precipitation events at the sub-seasonal timescale remains a big challenge for operational global prediction systems. Over the Far East in summer, climate and precipitation are strongly influenced by the fluctuating western Pacific subtropical high (WPSH) and strong precipitation is often associated with southeasterly low-level wind that brings moist-laden air from the southern China seas. The WPSH variability is partly influenced by quasi-stationary wave-trains propagating eastwards from Europe across Asia along the two westerly jets: the Silk-Road wave-train along the Asian jet at mid-latitudes and, on a more northern route, the polar wave-train along the sub-polar jet. While the Silk-Road wave-train appears as a robust, internal mode of variability in seasonal predictions models, its predictability is very low on the sub-seasonal to seasonal time scale.
A case in point is the unusual summer of 2010, when China experienced its worst seasonal flooding for a decade, triggered by unusually prolonged and severe monsoonal rains. In addition that summer was also characterized by record-breaking heat wave over Eastern Europe and Russia as well as catastrophic monsoonal floods in Pakistan 2010. The impact of the latter circulation anomalies on the precipitation further east over China, has been little explored. Here, we examine the role and the actual predictability of the Silk-Road wave-train, and its impact on precipitation over Northeastern China throughout August 2010, using the high-resolution IFS forecast model of ECMWF, realistic initialized and run in an ensemble mode.
We demonstrate that the forecast failure with regard to flooding and extreme precipitation over Northeastern China in August 2010 is linked to the failure to represent intra-seasonal variations of the Silk-Road wave-train and the associated intensification of the WPSH.
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