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Title: Seamless precipitation prediction skill in the tropics and extratropics from a global model
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Abstract:
The skill with which a coupled ocean-atmosphere model is able to predict precipitation over a range of time scales (days to months) is analysed. For a fair comparison across a seamless range of scales, the verification is performed using data averaged over time windows equal in length to the forecast lead time. At a lead time of one day, skill is greatest in the extratropics around 40-60º latitude, lowest around 20º, and has a secondary local maximum close to the equator. The extratropical skill at this short range is highest in the winter hemisphere presumably due to the higher predictability of winter baroclinic systems. The local equatorial maximum comes mostly from the Pacific, and thus appears to be from the El Niño-Southern Oscillation. As both lead time and averaging window are simultaneously increased, the extratropical skill drops rapidly with lead time, while the equatorial maximum remains approximately constant causing the equatorial skill to exceed the extratropical at leads > 4 days in austral summer and > 7 days in boreal summer. At longer lead times, the extratropical skill eventually flattens out or increases, but does not approach the equatorial values. Comparisons with persistence confirm that the model beats persistence for most leads and latitudes, including for the equatorial Pacific where persistence is high. The results are consistent with the view that extratropical predictability is mostly derived from synoptic-scale atmospheric dynamics, while tropical predictability is primarily derived from the response of moist convection to slowly-varying forcing such as from sea surface temperature.
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