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Multi-model projection of the Northern Hemisphere storminess: subseasonal to seasonal cycles

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The Northern Hemisphere (NH) extratropical storminess, as defined by high-frequency eddy geopotential height variance at 250 hPa, is examined using a subset of climate models that have participated in the Coupled Model Inter-Comparison Project phase 5 (CMIP5). The CMIP5 models generally underestimate the NH storminess on the poleward side of climatological maxima especially over the North Atlantic to Siberia. This bias is observed in all seasons with a slightly weaker amplitude in winter, not affecting overall seasonal cycle of storminess. However, the models are found to noticeably underestimate a peculiar sub-seasonal cycle of the Pacific storminess, the so-called mid-winter suppression of the Pacific storminess, by significantly underestimating the Pacific storminess in late fall.

The Representative Concentration Pathway (RCP) 8.5 integrations predict that seasonal cycles of both the Atlantic and Pacific storminess would be enhanced in a warm climate as winter-time storminess would intensify but summer-time storminess would not. This strengthened seasonal cycle, however, does not affect a sub-seasonal cycle of the Pacific storminess: No significant change in the mid-winter suppression of the Pacific storminess is predicted to occur.