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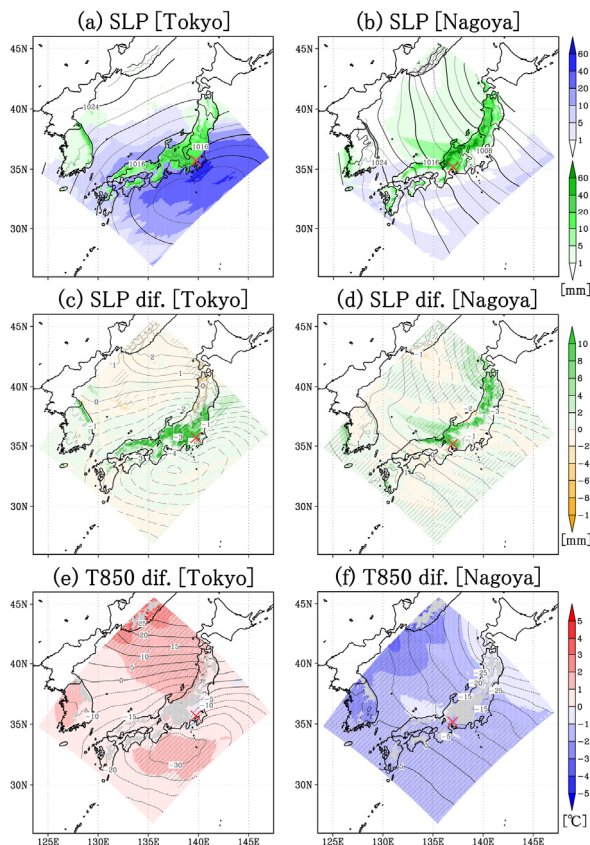


Figure 1. Composite of top 30 heavy daily snowfall events in d4PDF-DS at Tokyo and Nagoya. (a-b) Daily snowfall (green), rainfall (blue), SLP (contour), and (c-d) their differences between d4PDF-DS and JRA55-DS (d4PDF minus JRA55). (e-f) Differences of air temperature at 850 hPa (shading) and geopotential height (contour).

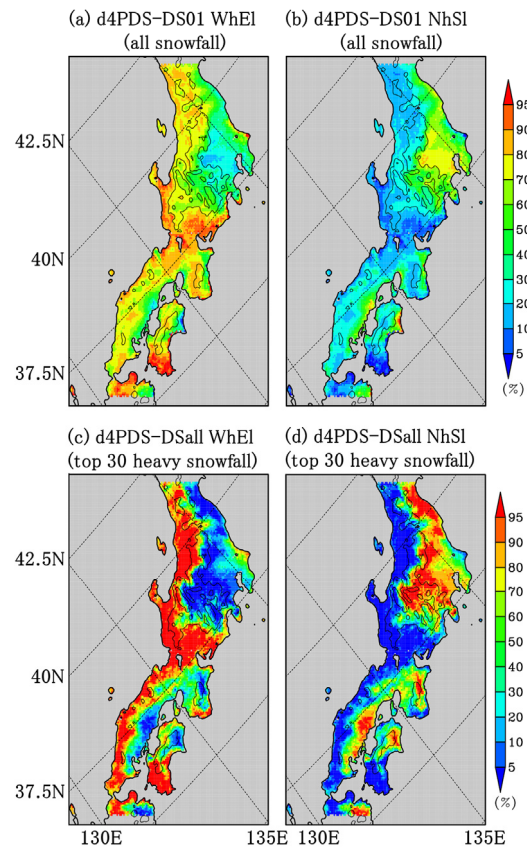


Figure 2. Percentages of SLP pattern occurrences. (a,c) A cold outbreak pattern and (b,d) a southern coastal extratropical cyclone pattern in (a-b) all snowfall events in d4PDF-DS01 and in (c-d) top 30 heavy daily snowfall events of d4PDF-DSall.

- We investigate the characteristics of synoptic conditions for heavy daily snowfall from western to northeastern Japan in the present climate, analyzing high-resolution regional climate ensemble experiments with 5-km grid spacing based on d4PDF (310 years) and JRA-55 (31 years).
- A comparison between JRA55-DS and d4PDF-DS indicates that heavier snowfall can occur due to more developed extratropical cyclones and enhanced cold air damming in Tokyo, while stronger cold air outbreaks and enhanced JPCZ can produce much heavier snowfall in Nagoya.
- Top 30 heavy snowfall events show much clearer geographical boundaries of two typical pattern, i.e., cold air outbreaks and southern coastal extratropical cyclones, than all snowfall events do.