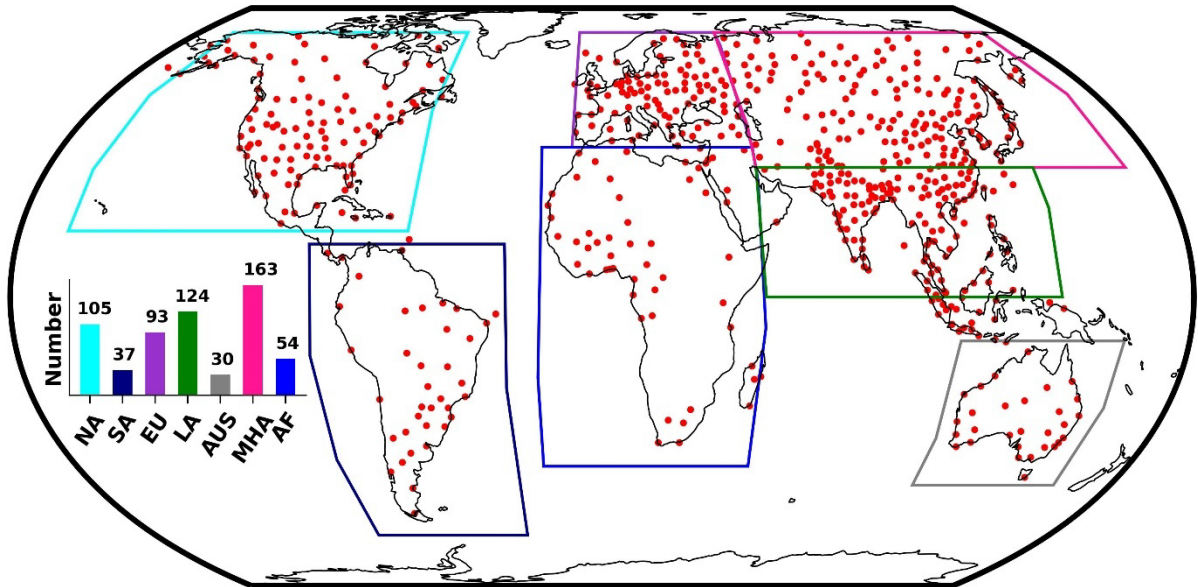


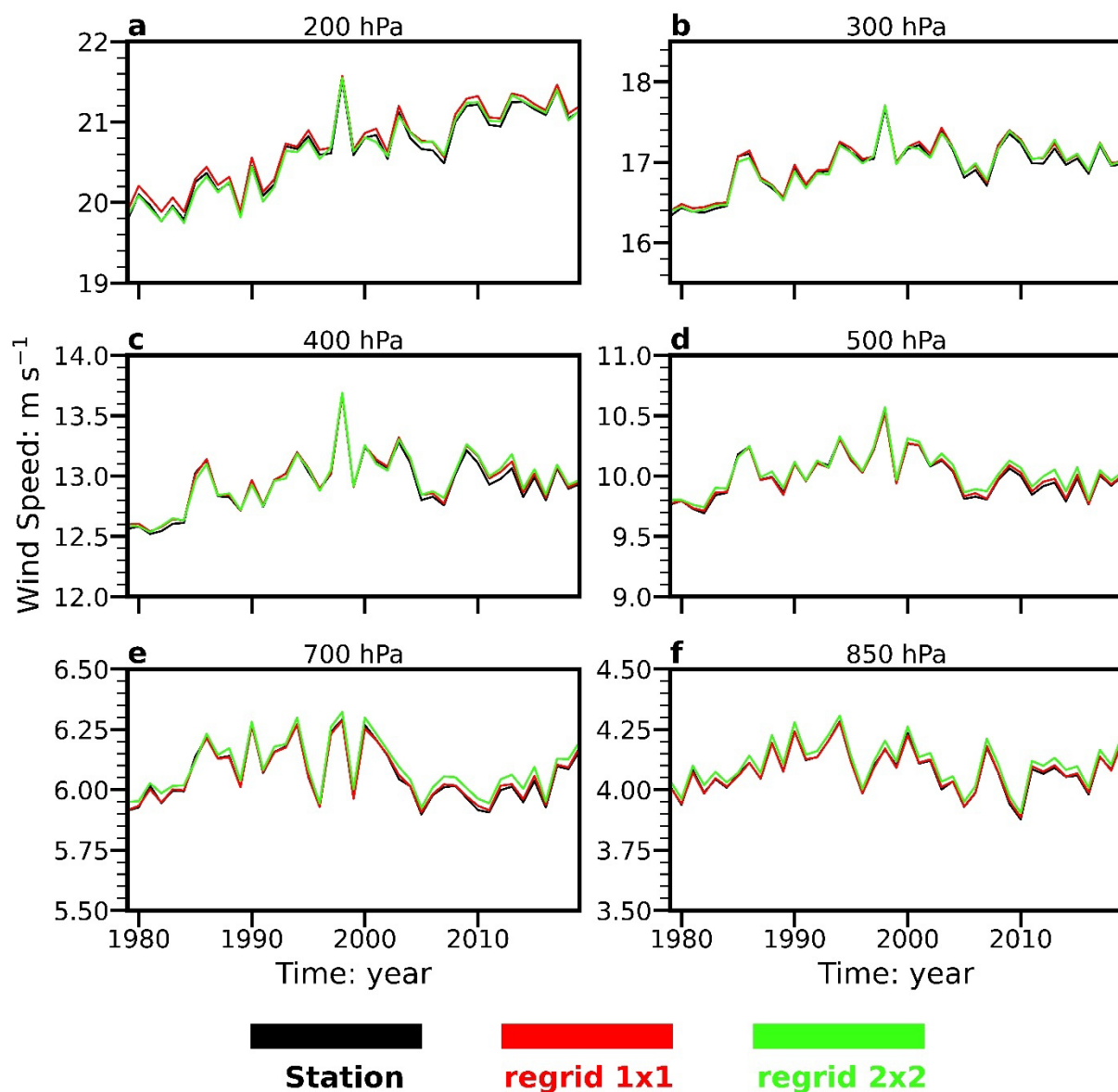
Supplementary Information

Global analysis of tropospheric wind speed from reanalyses and IGRA radiosonde

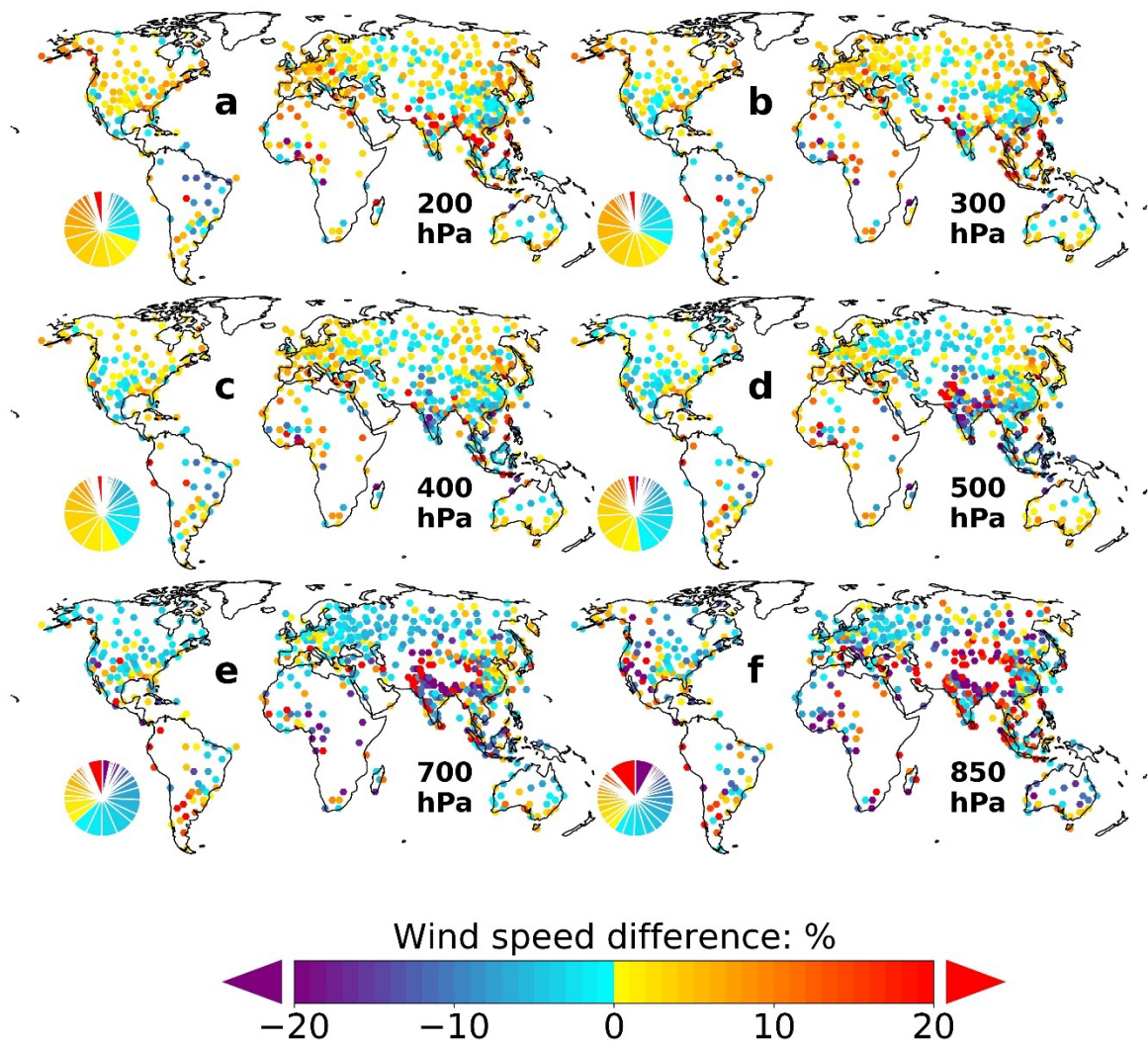
Yue Yu, Cheng Shen, Gang Wen, Deliang Chen, Zhi-Bo Li



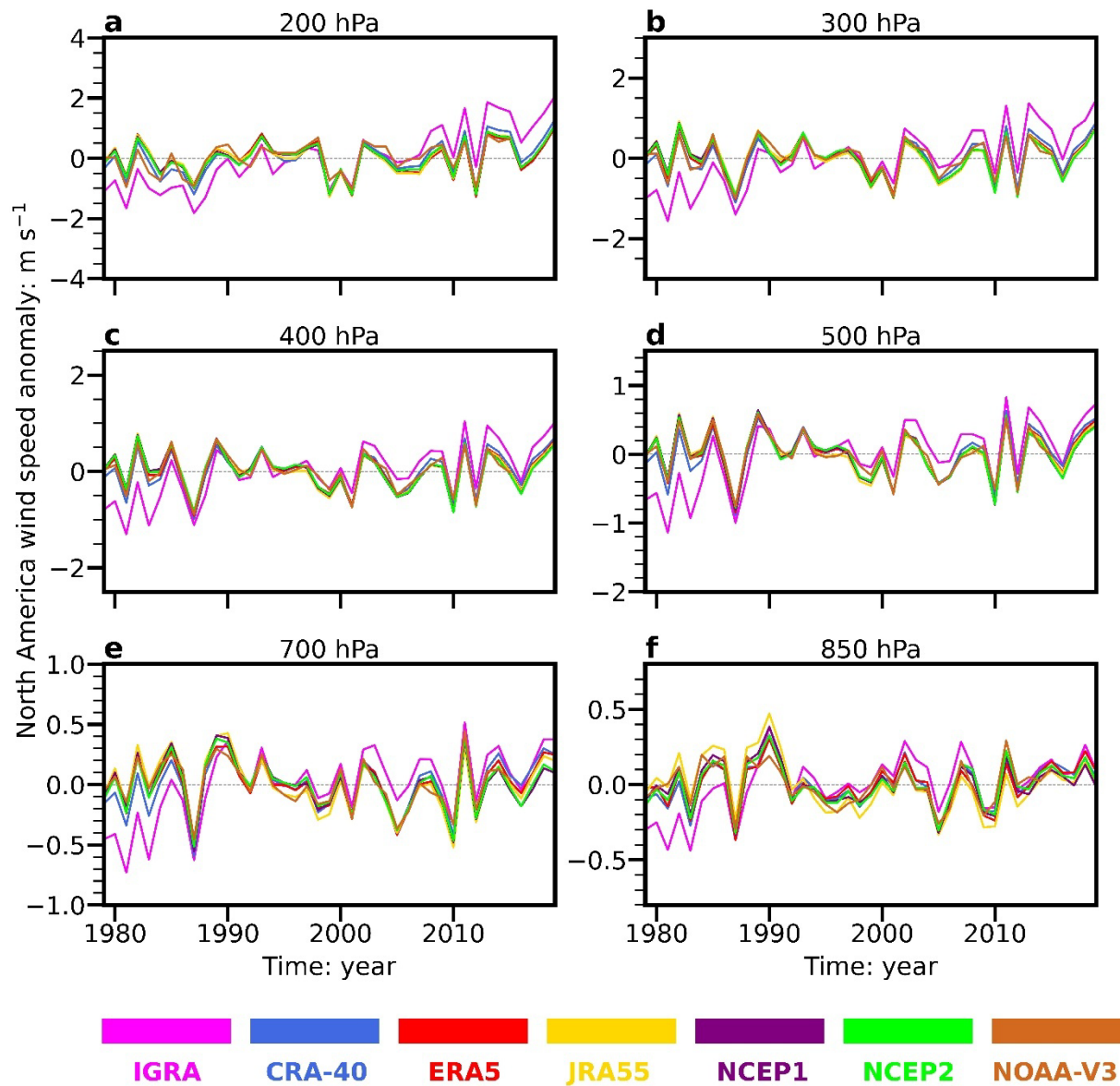
Supplementary Figure 1. Global distribution and quantity of IGRA sites over land. The column bars in the bottom left corner denote the number of available observations in each sub-region. NA, SA, EU, LA, AUS, MHA and AF represent North America (165°W–65°W, 15°N–70°N), South America (90°W–30°W, 60°S–10°N), Europe (10°W–50°E, 35°N–70°N), Low Latitude Asia (50°E–140°E, 0°–30°N), Australia (110°E–160°E, 45°S–10°S), Mid-high Latitude Asia (50°E–170°E, 30°N–70°N), and Africa (20°W–50°E, 40°S–35°N), respectively.



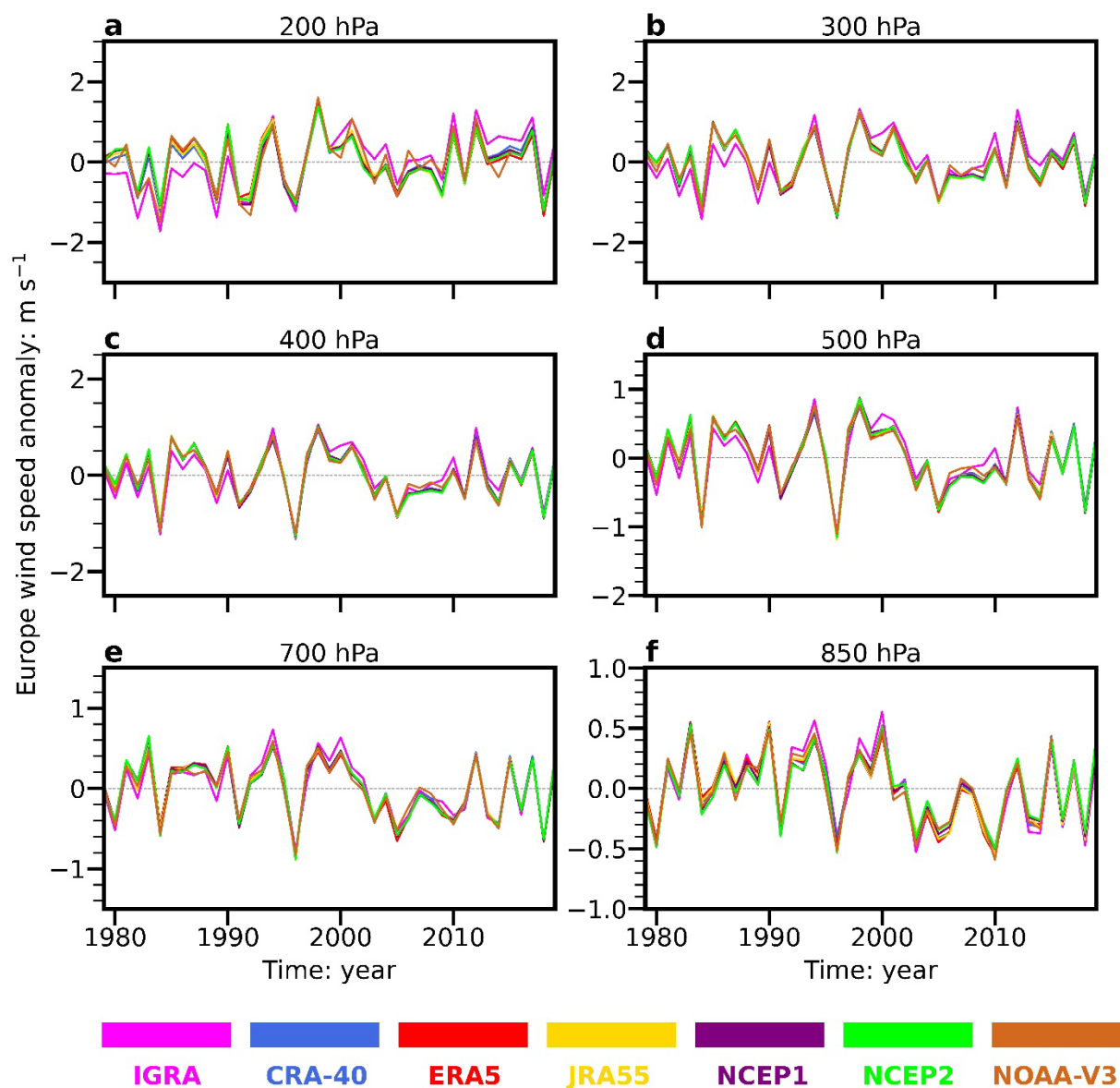
Supplementary Figure 2. (a) Temporal evolution of global wind speed at 200 hPa from Integrated Global Radiosonde Archive during 1979–2019. The black, red, and green solid lines denote the original station, 1° resolution, and 2° resolution of the grid-transformed data, respectively. (b–f) Same as (a), but for wind speed at 300, 400, 500, 700, and 850 hPa, respectively.



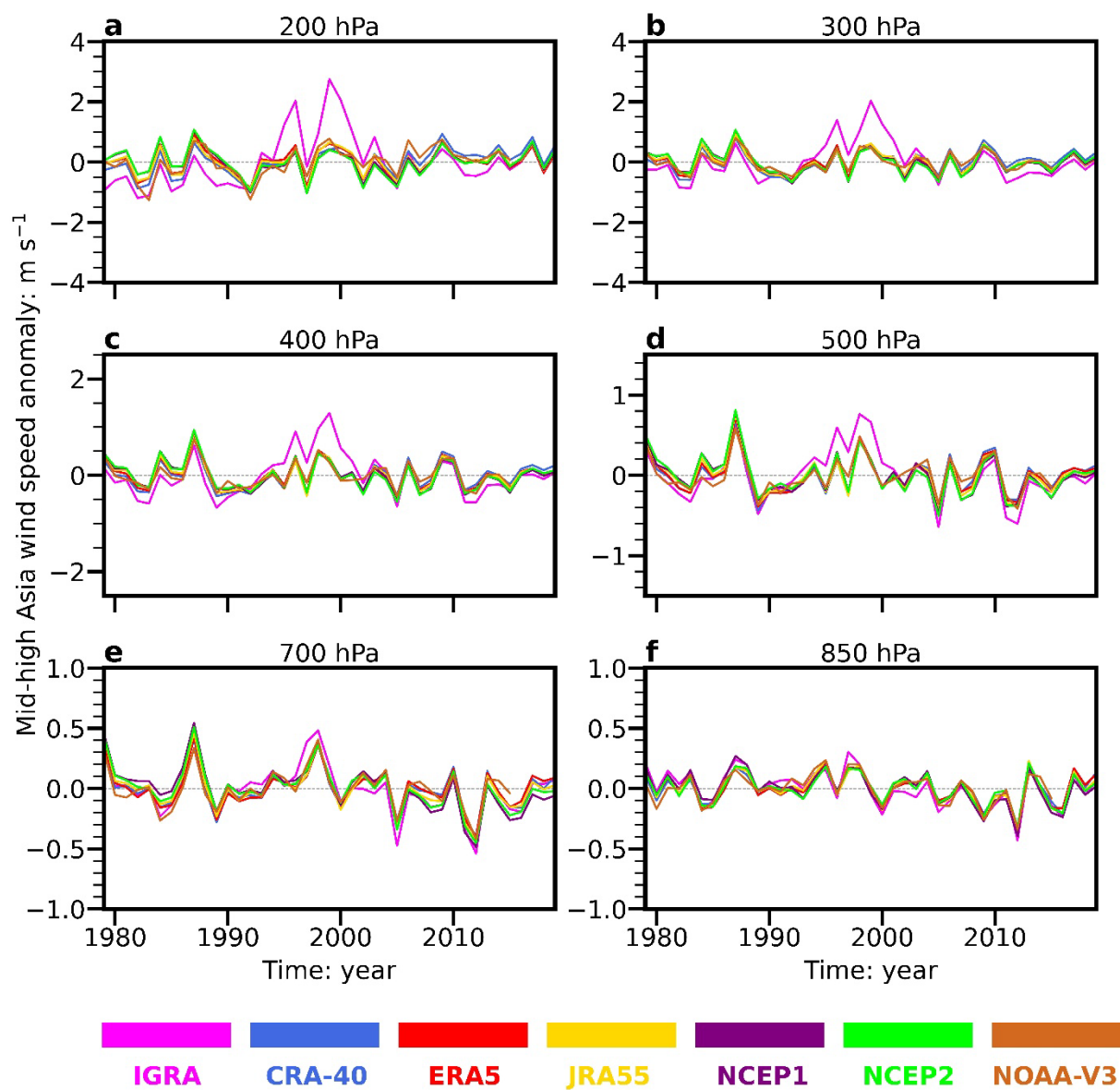
Supplementary Figure 3. (a) Relative spatial distribution of the annual-mean wind speed difference (%) between the ensemble-mean of five reanalysis datasets (excluding NOAA-V3) and Integrated Global Radiosonde Archive at 200 hPa. (b–f) Same as (a), but for wind speed at 300, 400, 500, 700, and 850 hPa, respectively.



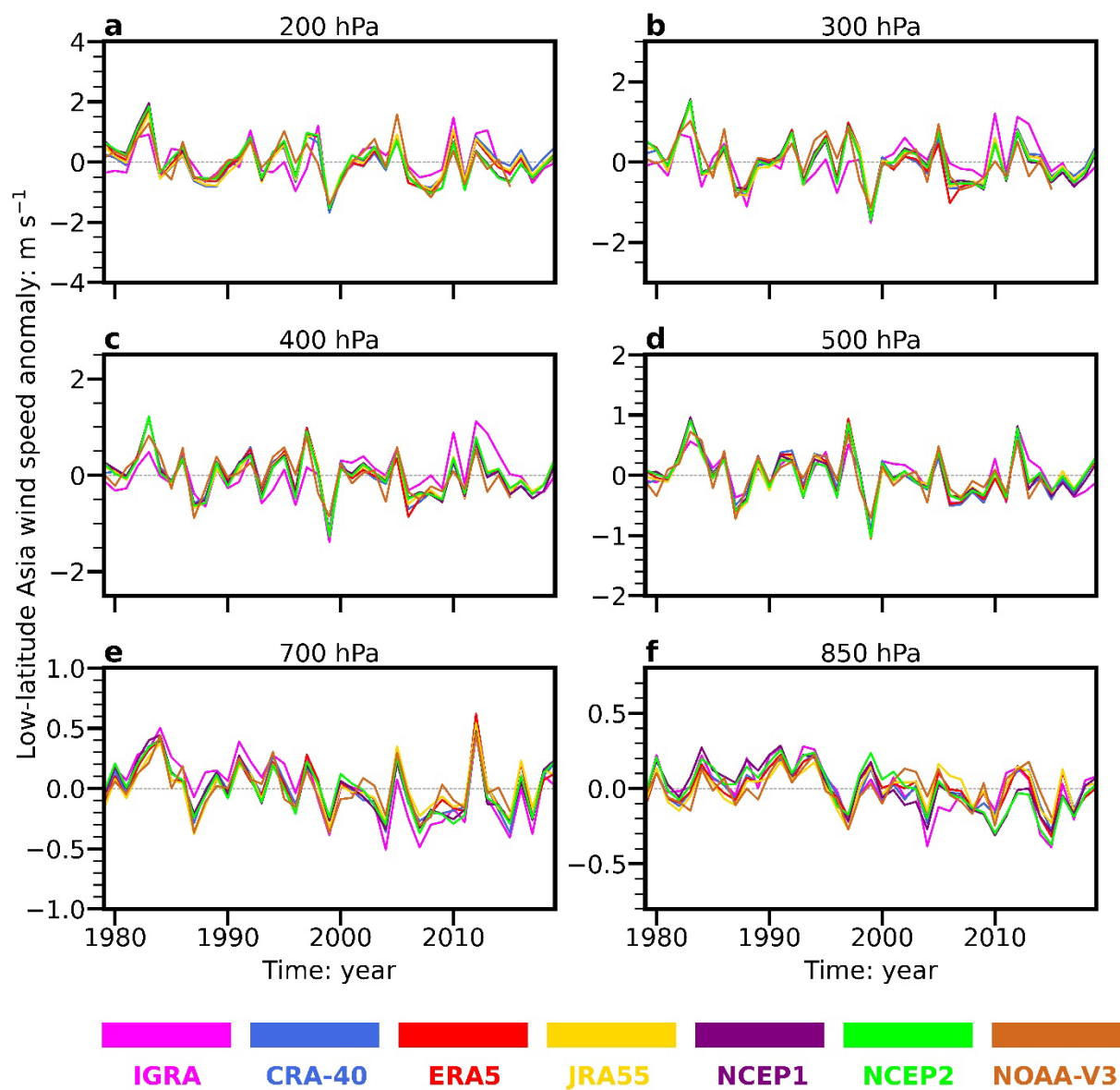
Supplementary Figure 4. (a) Temporal evolution of North American anomalous wind speed at 200 hPa from Integrated Global Radiosonde Archive and six reanalysis datasets during 1979–2019. The pink, blue, red, yellow, purple, green, and brown solid lines denote wind speed from IGRA, CRA-40, ERA5, JRA55, NCEP1, NCEP2, and NOAA-V3, respectively. (b–f) Same as (a), but for wind speed at 300, 400, 500, 700, and 850 hPa, respectively.



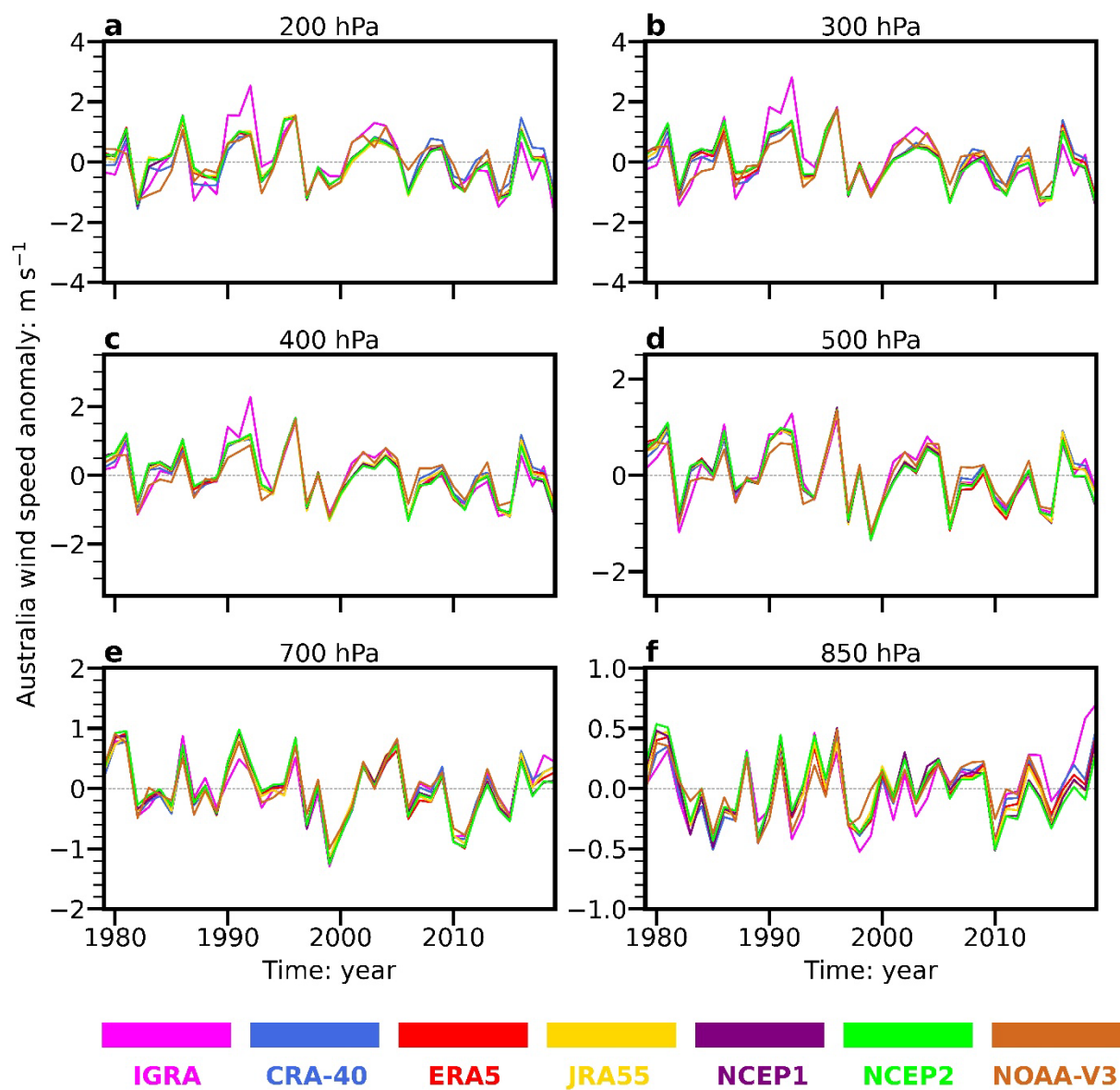
Supplementary Figure 5. Same as Figure S4, but for wind speed in Europe.



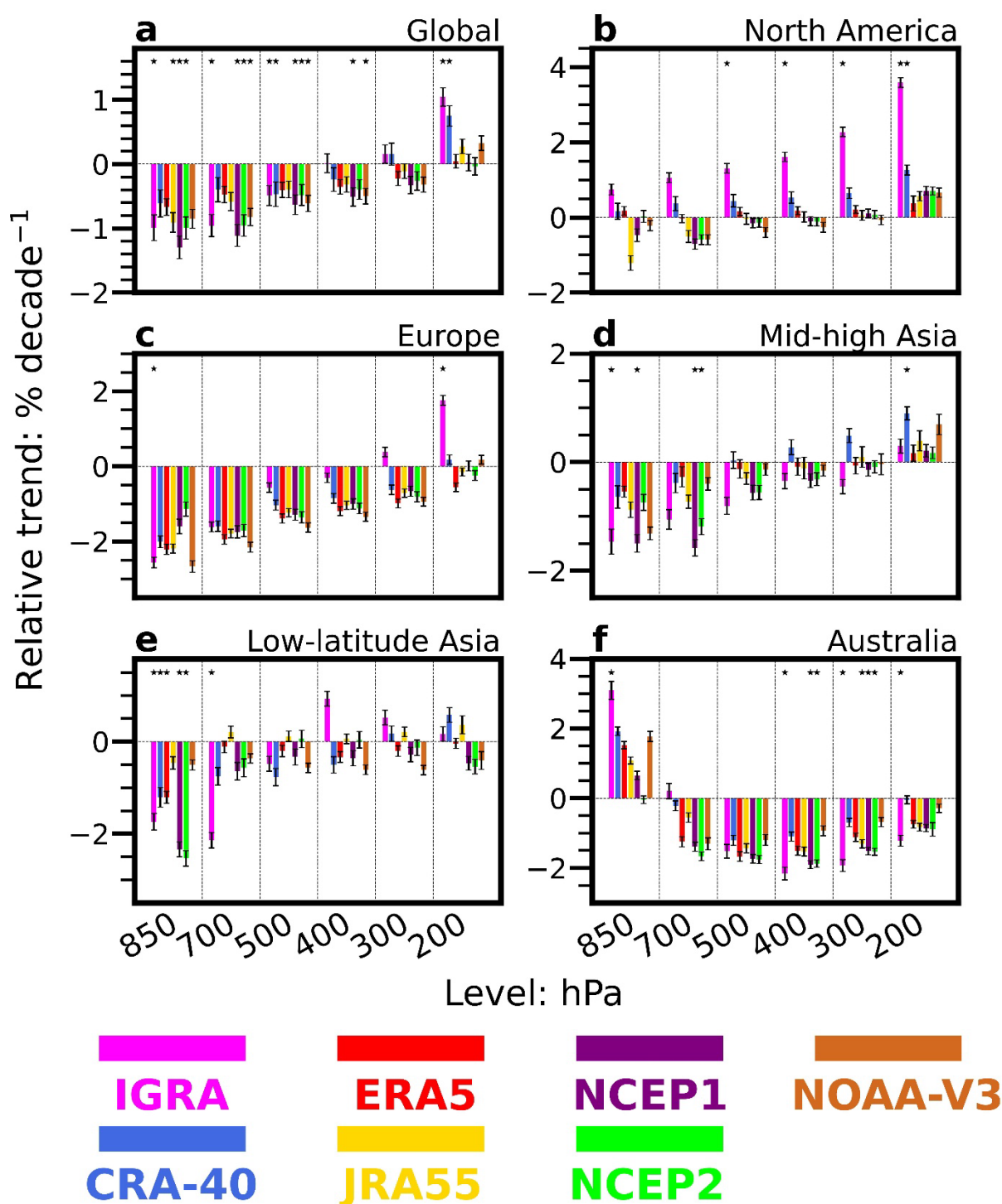
Supplementary Figure 6. Same as Figure S4, but for wind speed in Mid-high Latitude Asia.



Supplementary Figure 7. Same as Figure S4, but for wind speed in Low Latitude Asia.



Supplementary Figure 8. Same as Figure S4, but for wind speed in Australia.



Supplementary Figure 9. (a) Relative trend (trend divided by climatological mean) for the global averaged annual-mean wind speed (% decade⁻¹) at six pressure levels (200–850 hPa) in IGRA and six reanalysis datasets (CRA-40, ERA5, JRA55, NCEP1, NCEP2, NOAA-V3) from 1985 to 2019. The value with an asterisk means the trend is significant at 0.05 levels. Error bar denotes the standard deviation of relative trend at each grid point in the given dataset and level. Analysis performed on the NOAA-V3 is from 1985 to 2015. (b–h) Same as (a), but for North America, Europe, Mid-high latitude Asia, Low latitude Asia, and Australia, respectively.