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Title	Recent increase in heat wave frequency around Mongolia: role of atmospheric forcing and possible influence of soil moisture deficit
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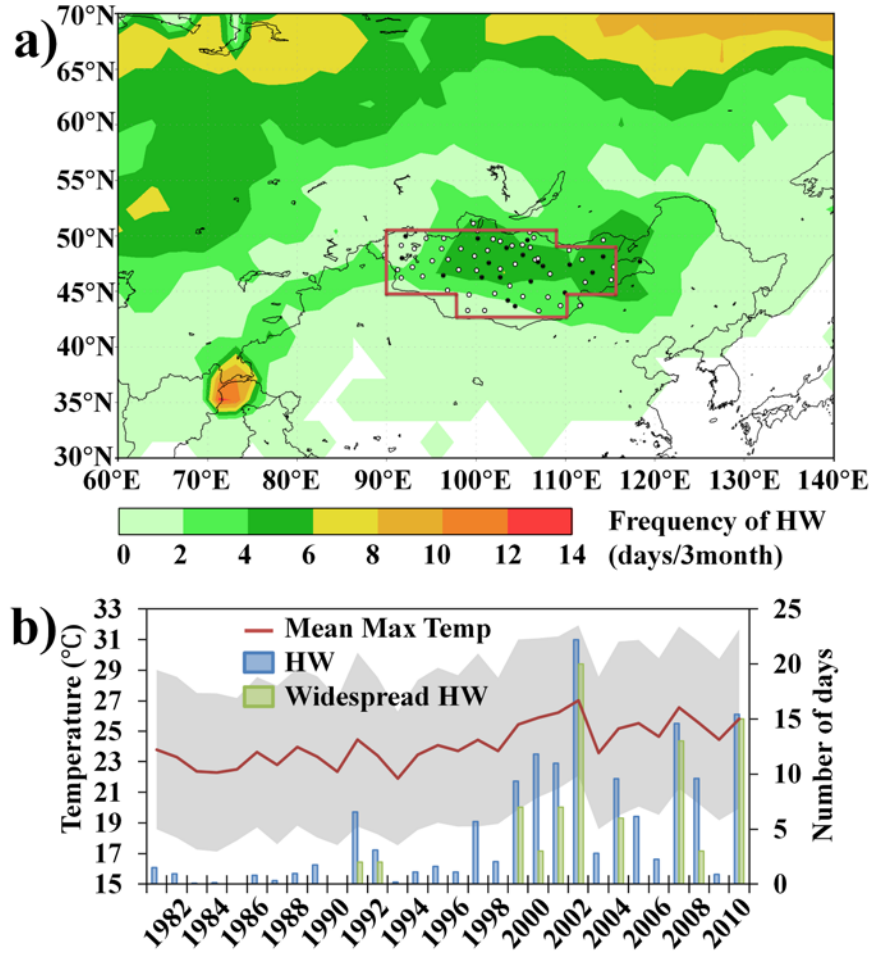


Figure 1. a) Climatology of HW frequency determined from reanalysis data. White and black circles indicate the 70 surface meteorological stations. Black circles indicate 21 stations used for soil moisture. Red line shows the area used for Fig. 4. b) Interannual variation of JJA-mean maximum air temperature and its standard deviation (grey shading) averaged over the 70 stations in Mongolia. Bars represent the annual number of HW and widespread HW (when more than half of the 70 stations simultaneously observed HW) days, respectively.

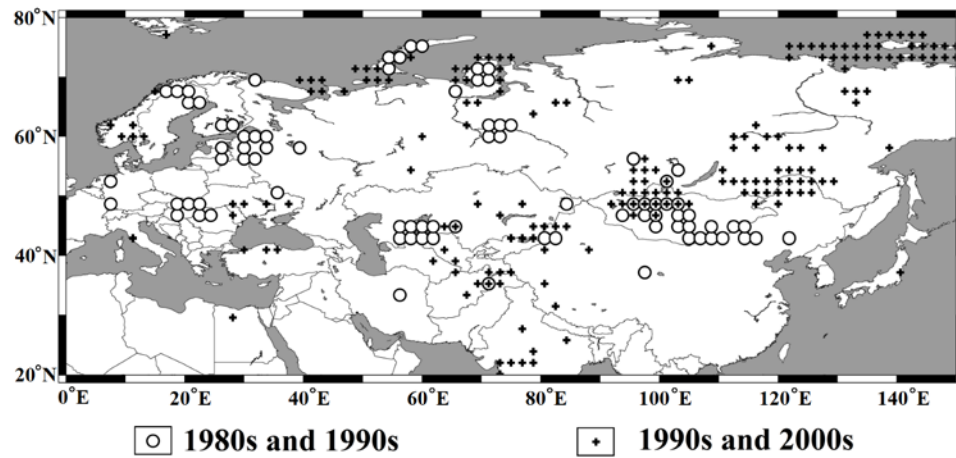


Figure 2. Locations where the decadal HW change is significant using the NCEP/NCAR Reanalysis 1 data. Circle and plus sign are plotted where significant difference was detected in each decade.

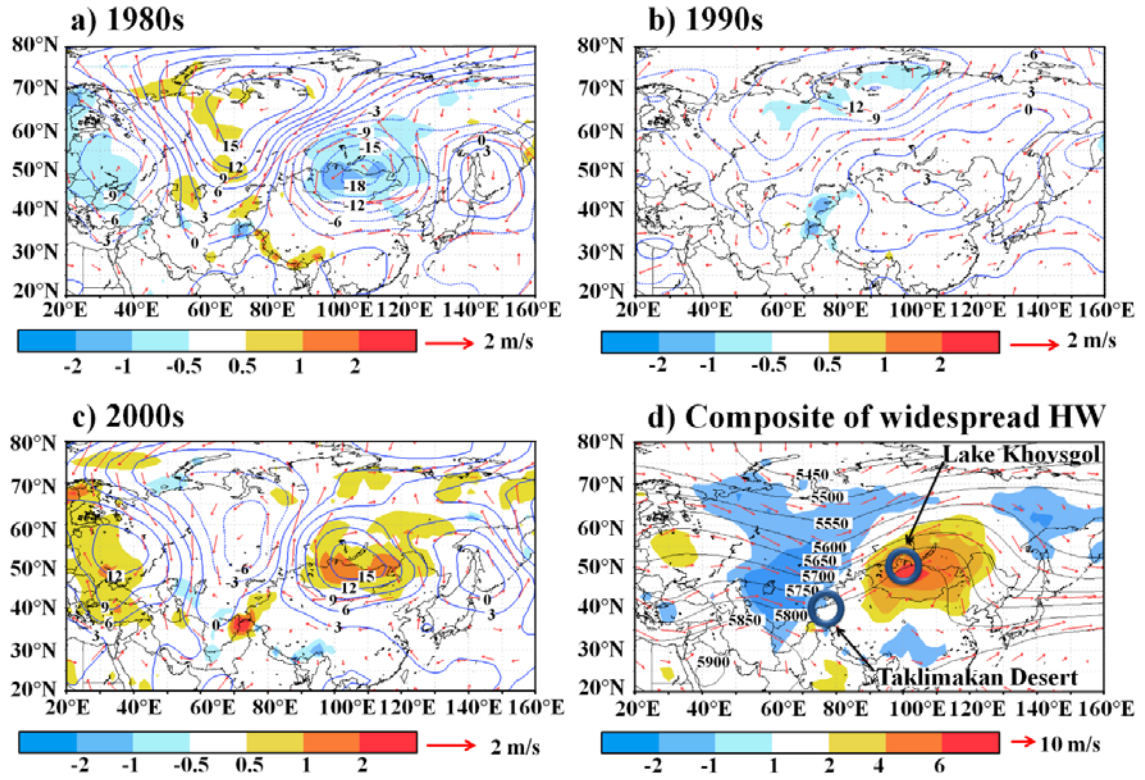


Figure 3. (a-c) Anomalies of decadal mean 500 hPa geopotential height (m, contour), wind (m/s, arrow), and 2-m temperature (°C, shading) from their climatological mean (1981-2010). (d) Composite geopotential height and temperature anomaly for widespread HW events. Blue circles indicate locations used to define ACF.

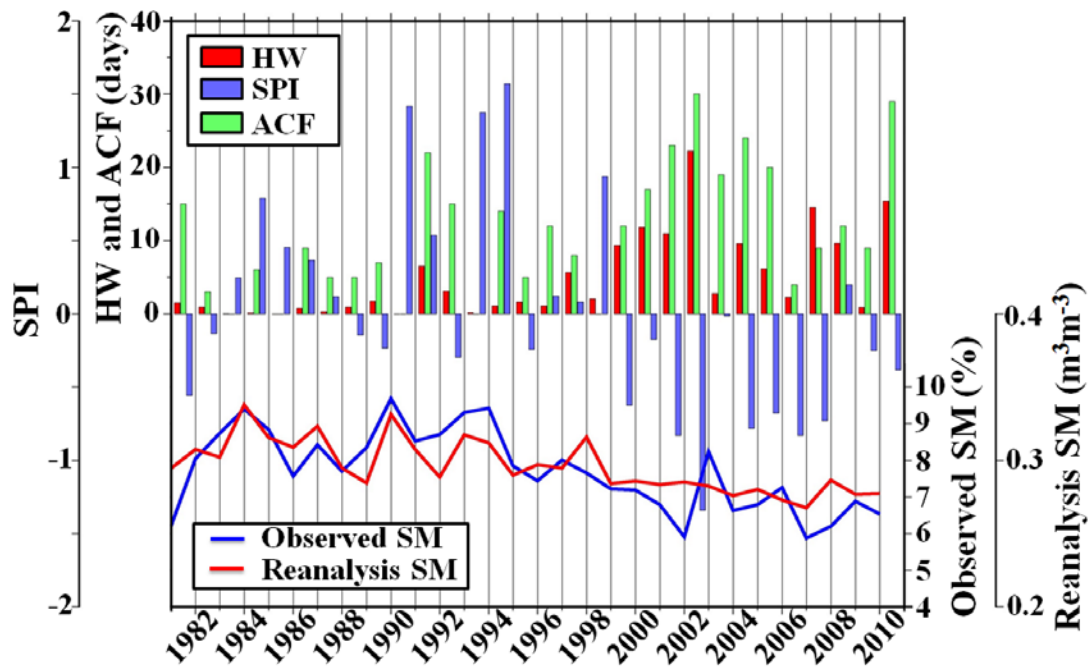


Figure 4. Interannual variation of HW, ACF, SPI, and SM. For SM, local observation and reanalysis are displayed. HW and SPI are averaged over all 70 stations, while observed SM is averaged over 21 stations. Reanalysis SM is averaged over the framed area in Fig. 1.

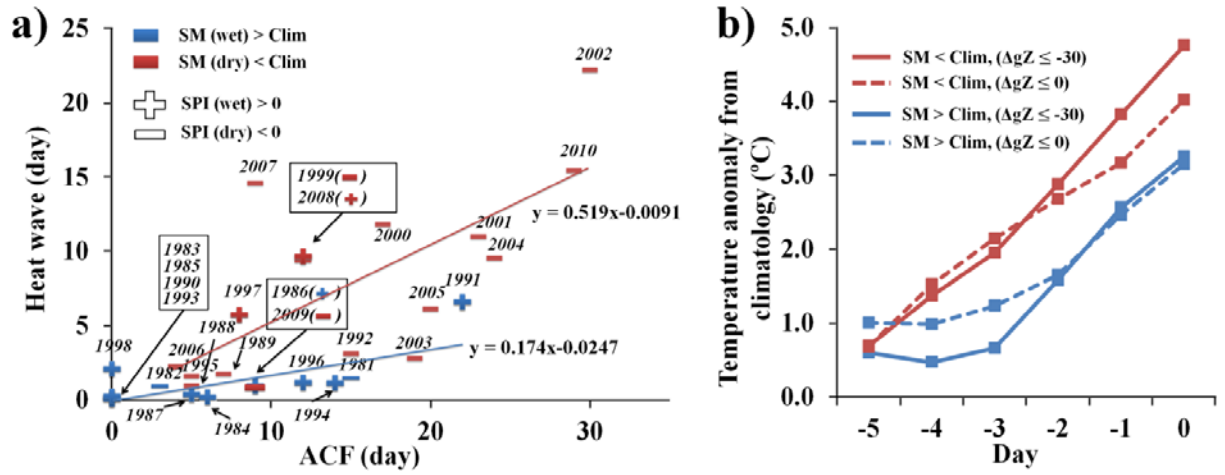


Figure 5. (a) Scatter plot between ACF and HW with different SPI and reanalysis SM. Plus (minus) sign for SPI indicates wet (dry) years. For SM, blue and red colours indicate wet and dry years, respectively. (b) Composite of daily temperature tendencies before ΔgZ becomes lower than the threshold values (day=0). Dashed and solid lines are for strong and very strong atmospheric forcing, respectively. Red and blue lines represent dry and wet initial SM condition, respectively.

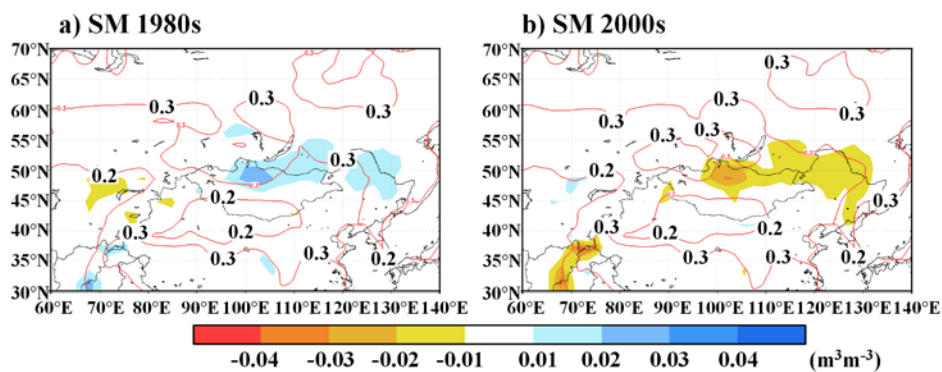


Figure S1. Horizontal distribution of reanalysis SM during (a) 1980s and (b) 2000s. Contours and shading indicate decadal mean and anomaly with respect to climatology, respectively.