

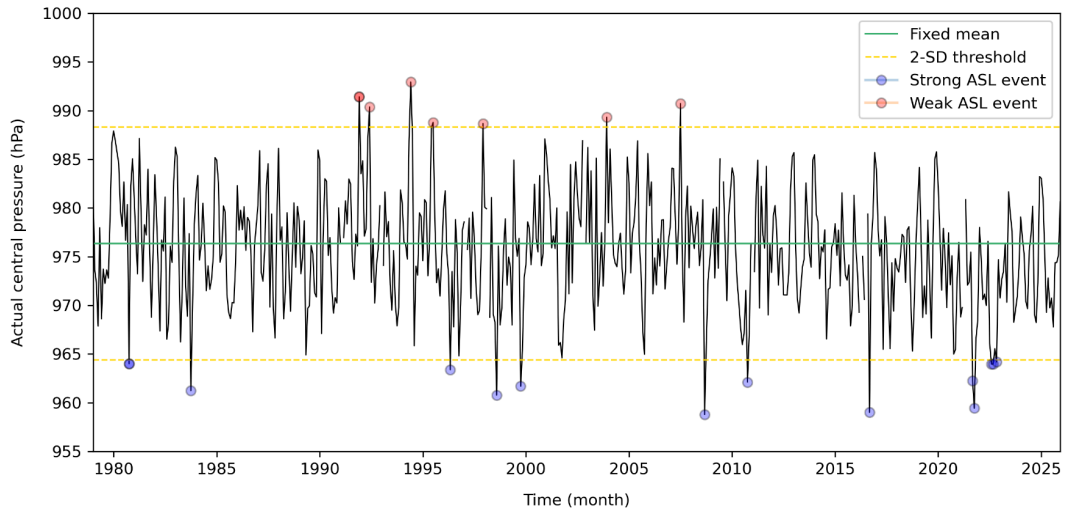


Fig. 1: Time series of ASL ACP highlighting extreme ASL events identified during the period 1979-2025. Extremely strong (blue) and weak (red) ASL events are shown relative to the fixed mean (solid green line) and 2-SD thresholds (yellow dashed lines).

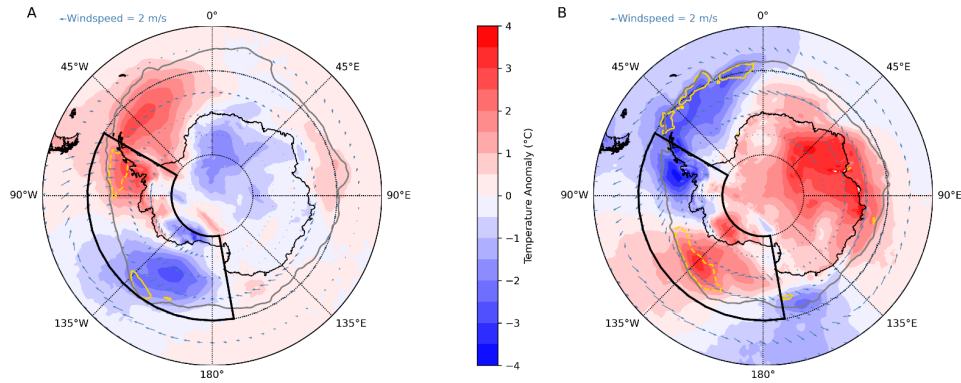


Fig. 2: Anomaly composites of surface conditions during extremely strong (a) and weak (b) ASL events between 1979-2025. Anomalous winds are represented with vectors while temperature anomalies are denoted using coloured shadings. Areas of positive and negative SIC anomalies are also visualized using solid and dashed contours, respectively. The climatological sea ice edge is added for reference and is shown as a gray solid line. Results suggest a dipole of ST and SIC across the study region during both extremely strong and weak ASL events.

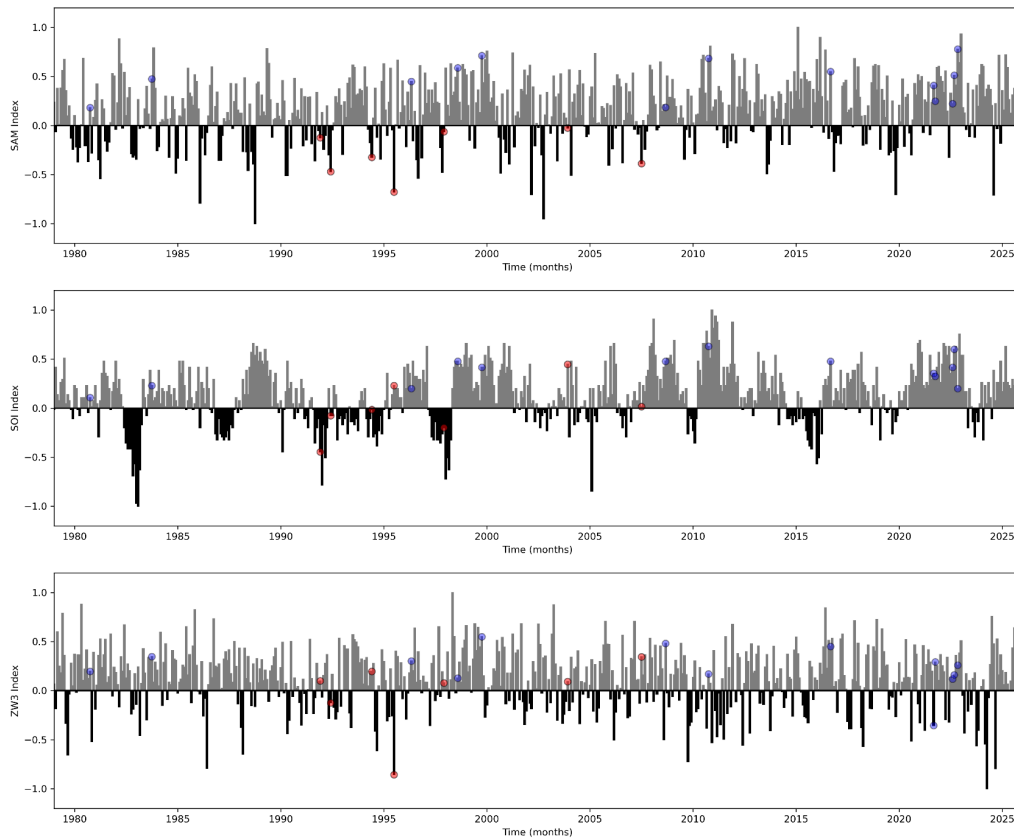


Fig. 3: Time series showing fluctuations in the polarity of SAM, ENSO, and ZW3 during the period 1979-2025. The positive phase of each MOV is shown in gray and the negative phase in black. Extremely strong (blue) and weak (red) ASL events identified during the study period are overlaid to provide a visual comparison of the timing of occurrence. All extremely strong (weak) events co-occur with SAM+ (SAM-); there is more complexity in co-occurrence across ENSO and ZW3.

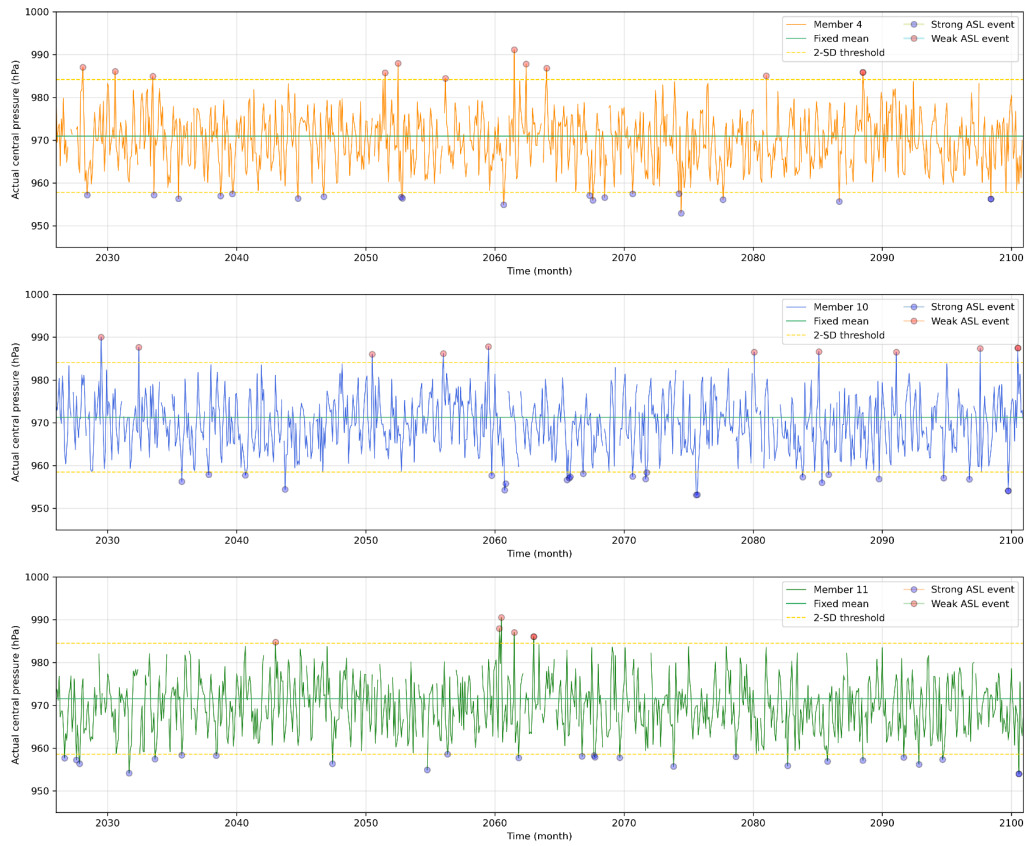


Fig. 4: Time series showing projected ASL variability for the period 2026-2100 under SSP245 conditions. Future extreme ASL events are identified using a fixed mean based on the historical period and are shown as red (weak) and blue (strong) circles in each of the three plots. Under a middle-of-the-road scenario, the three model members project the continued occurrence of both extremely strong and weak ASL events.

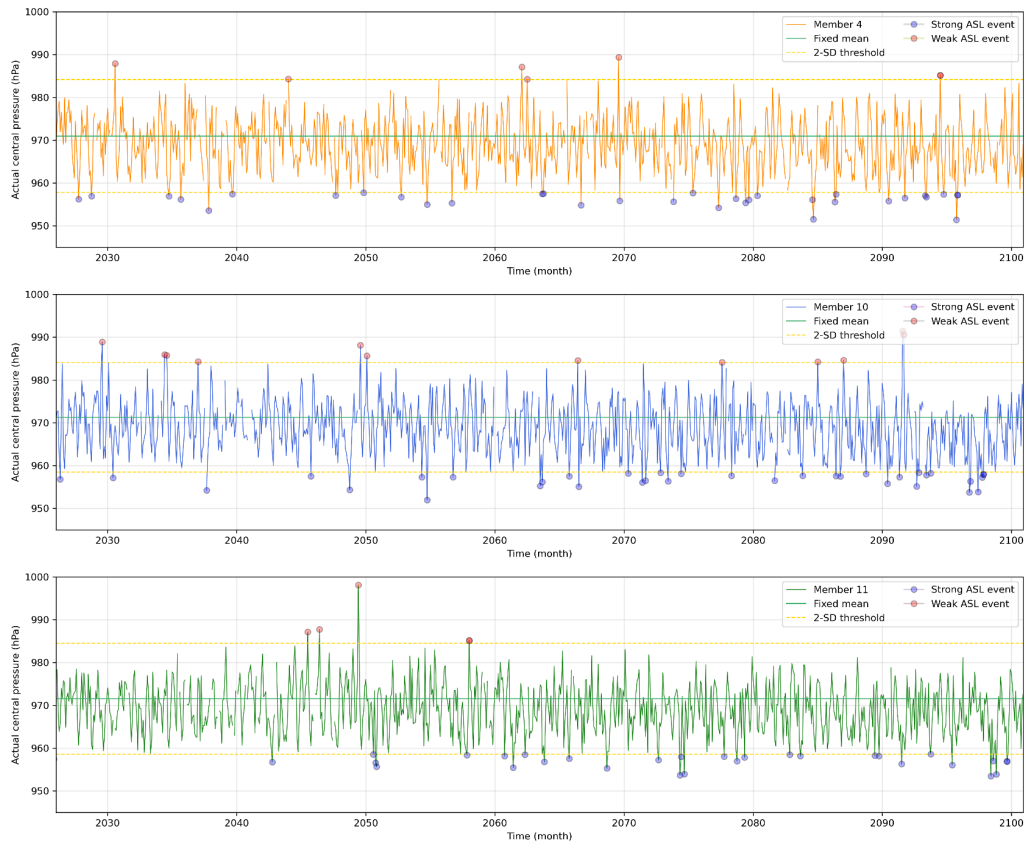


Fig. 5: Time series showing projected ASL variability for the period 2026-2100 under SSP585 conditions. Future extreme ASL events are identified using a fixed mean based on the historical period and are shown as red (weak) and blue (strong) circles in each of the three plots. Under a high-emission scenario, all three model members project extremely strong ASL events to develop more often than weak events.