Supplementary Figure Captions:

Figure S1: 1980-2012 vertically integrated moisture flux (vector, kg/m/s) and its respective divergence (shaded, mm/yr) in the Arctic (left-hand column), the Central (central column), and the Antarctic (right-hand column) domains for the MAM (top row), and SON (bottom row) temporal means. Data: Era-Interim

Figure S2: Moisture sources for the ice–core sites located in the Arctic (left-hand column), Central (central column), and Antarctic (right-hand column) domains for the MAM (top line), and SON (bottom line) temporal means. The contour lines represent the 95th percentile of the positive *E-P* values in the annual mean for each ice-core Lagrangian analysis. The asterisks indicate the location of the ice-core sites investigated, represented by different colours. The colours are for the Arctic domain: Logan (gray), Bona-Churchill (yellow), Windy Dome (orange), GISP-2 (blue), NEEM (brown), NGRIP (violet); for the Central domain: Huascarán (dark blue), Sajama (red), Grenzgletscher (green), Kilimanjaro (yellow), Everest (gray); for the Antarctic Domain: Byrd (purple), DML (clear blue), and Vostok (magenta).

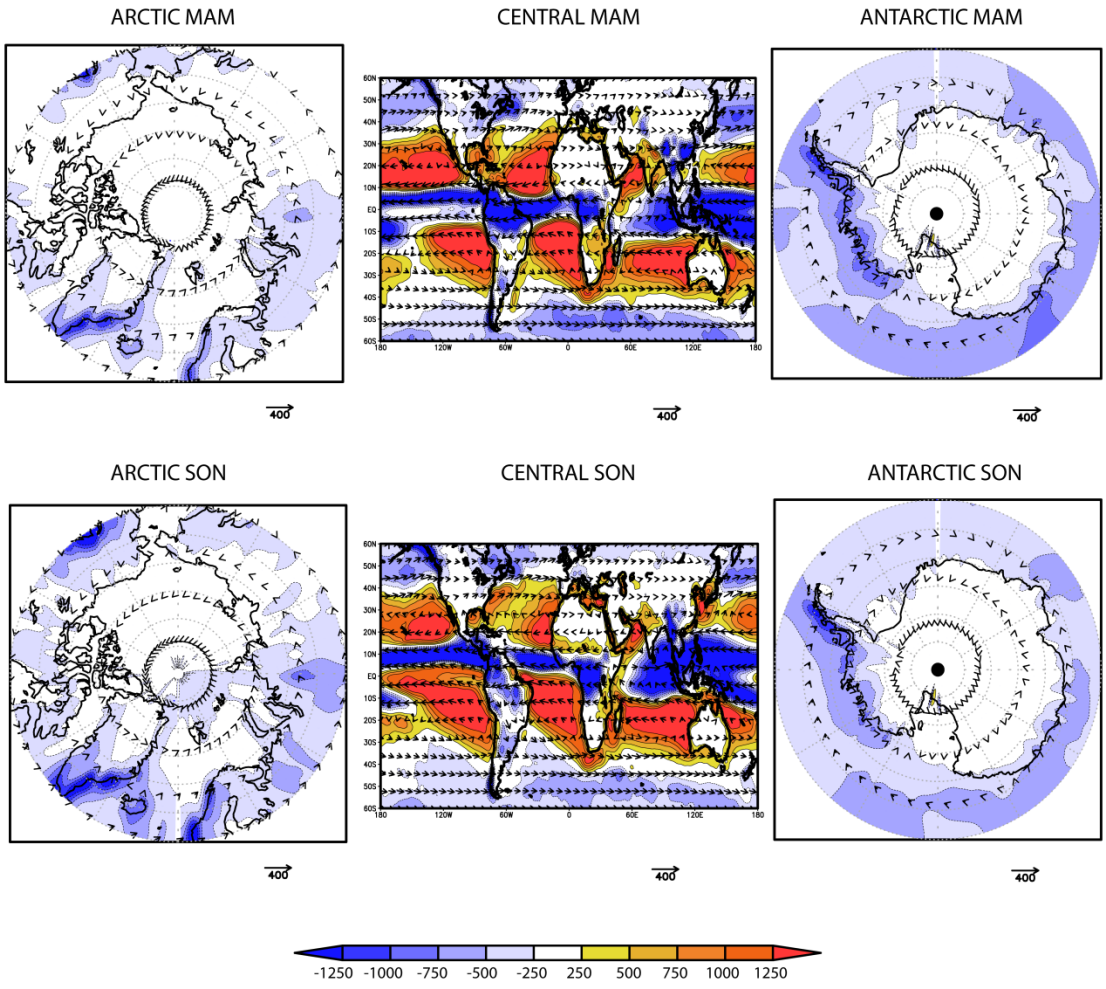
ARCTIC MAM
CENTRAL MAM
ANTARCTIC MAM
ARCTIC SON
CENTRAL SON
ANTARCTIC SON
-1250 -1000 -750 -500 -250 250 500 750 1000 1250

Figure S1

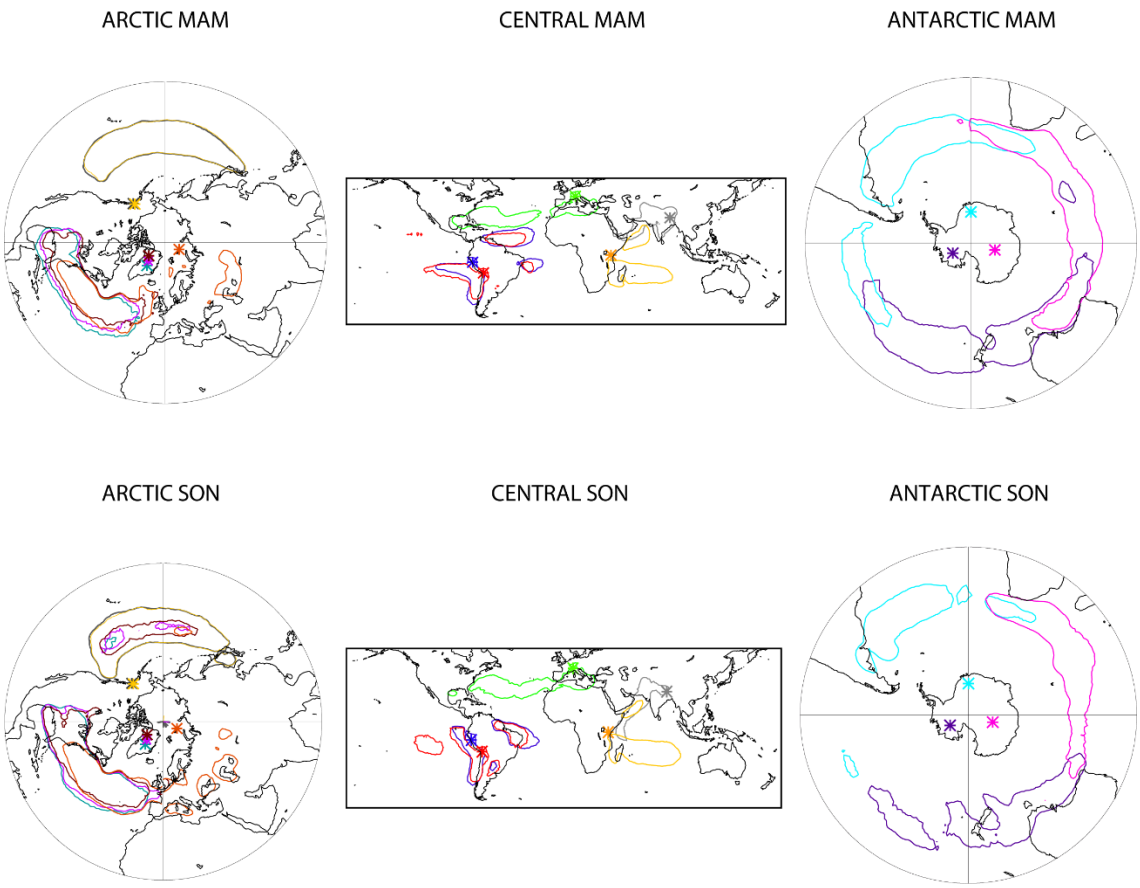
ARCTIC MAM
CENTRAL MAM
ANTARCTIC MAM
ARCTIC SON
CENTRAL SON
ANTARCTIC SON

Figure S2