**Figure S1:** AERONET comparison of AAE and SAE (440-675 nm) with the Ascension island site (a) and without (b). The grid box classifications are described in Cappa et al., 2016.
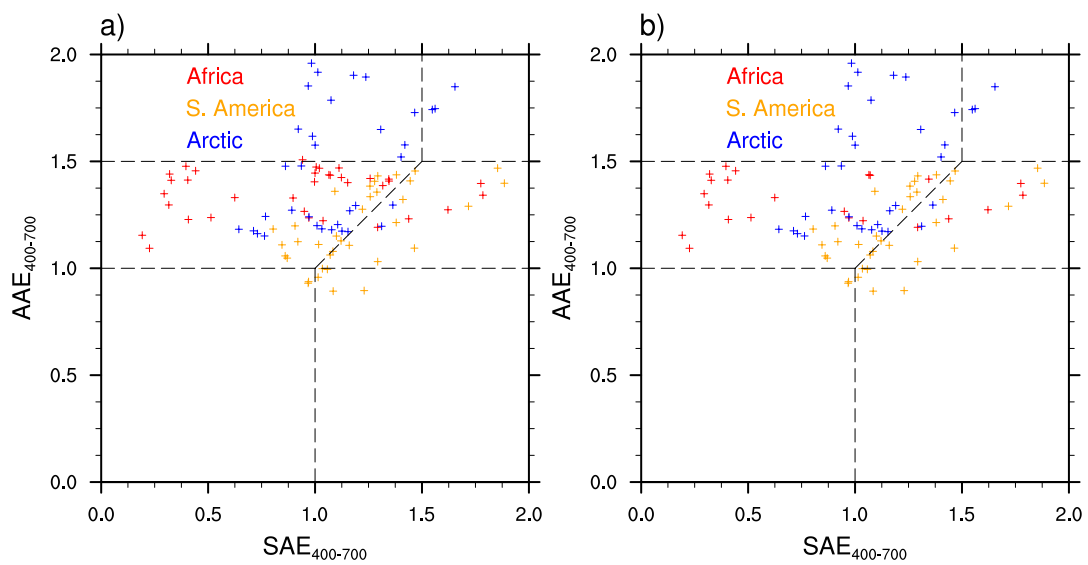
**Figure S2:** Same comparison as Fig S2 but comparing the BRC model run AAE and SAE (400-700 nm).
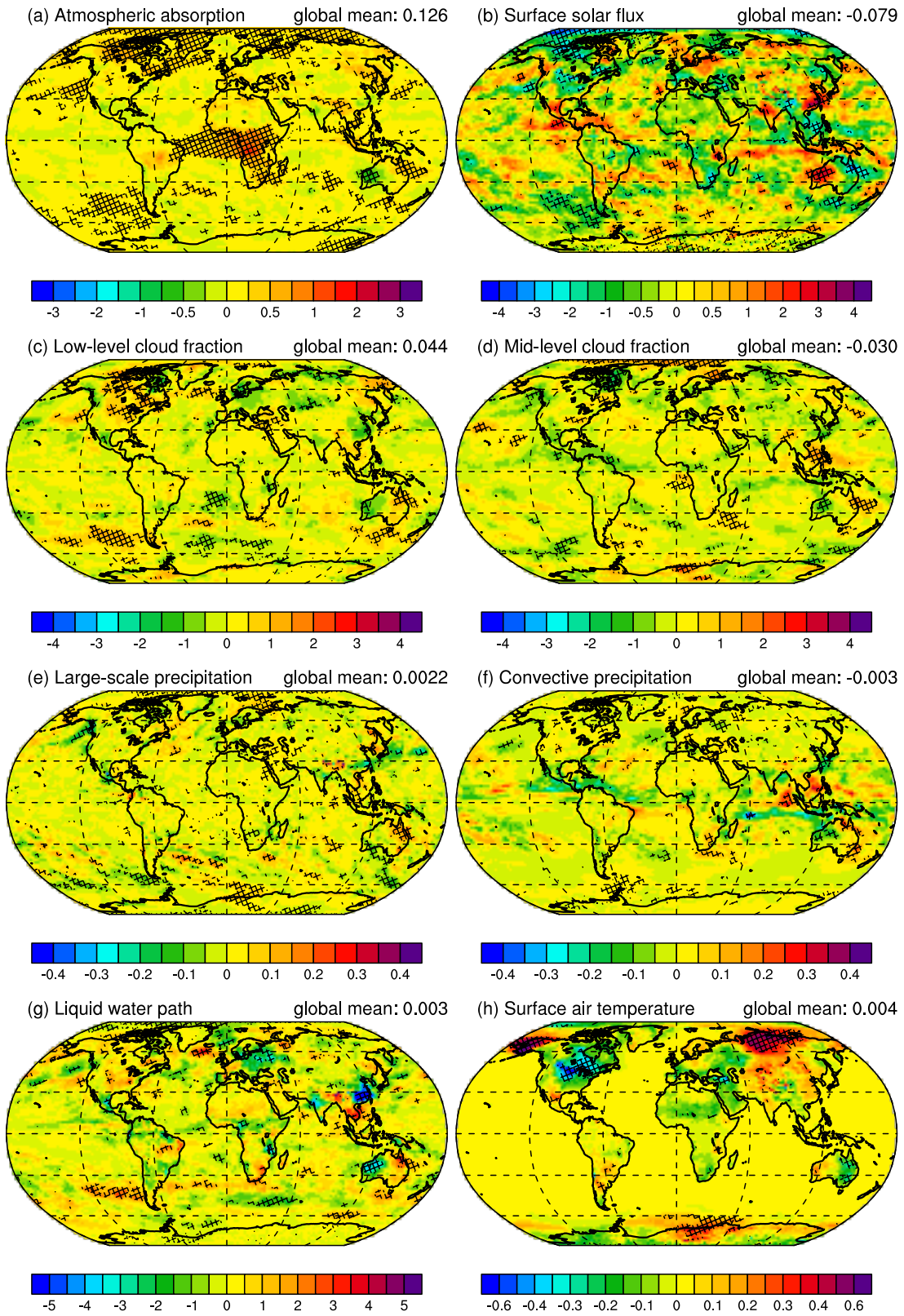
**Figure S3:** The effect of BrC additio with a bleaching parameterization on (a) atmospheric absorption (W m$^{-2}$), (b) surface solar flux (W m$^{-2}$), (c) low-level cloud

fraction (%; clouds below 700 mb), (d) Mid-level cloud fraction (%; clouds between 700 and 400 mb), (e) large-scale precipitation (mm day$^{-1}$), (f) convective precipitation (mm day$^{-1}$), (g) liquid water path (g m$^{-2}$), (h) surface air temperature (˚K). Hatching indicates significance in ensemble year change to the 0.1 level.
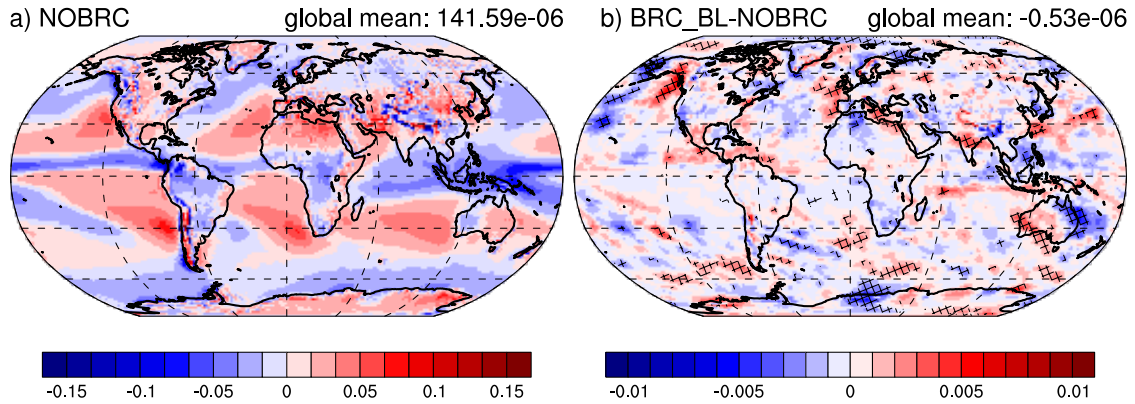
**Figure S4:** 500 mb omega in Pa s$^{-1}$: (a) the default annual average and (b) the difference with the incorporation of BrC and BrC bleaching. Hatching indicates significance in the ensemble year change to the 0.1 level.