## shp-atl-shift-1950: absolute difference surface flux surface concentration surface concentration surface concentration of SO2 – SH–sea surface flux of BC - SH-sea of SO4 – SH–sea 6.5e-21 2 8e-16 emibc $(kg m^{-2} s^{-1})$ nmrbc (kg kg-1) emiso2 (kg m<sup>-2</sup> s<sup>-</sup> 3.6e-21 2 1e-16 (kg kg - 1)2.5e-13 0e+00 ķď 7.5e-22 1.3e-16 0e+00 0.0e+00 -2.1e-21 5.8e-17 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – SH–sea upwelling shortwave flux at TOA – SH-sea upwelling clear-sky longway flux at TOA - SH-sea net radiative flux incident shortwave flux at TOA – SH–sea at TOA - SH-sea 6e-02 2e-07 $rsut (W m^{-2})$ 4e-03 rlutcs (Wm-2)rlut (Wm-2)3e-02 rsut (Wm-2)sdt (Wm-2)1e-07 2.5e-02 0e+00 00+00 0.0e+00 + Int+ -3e-02 -2.5e-02 -1e-07 -8e-03 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year upwelling clear–sky shortwa flux at TOA – SH–sea clear-sky net radiative implied cloud response dry deposition rate of BC – SH–sea wet deposition rate of BC – SH–sea $m^{-2}$ flux at TOA – SH–sea at TOA - SH-sea 8 1e-17 2 6e-16 $' m^{-2}$ ) rsutcs (W 1.0e-02 $m^{-2} s^{-1}$ drybc (kg m<sup>-2</sup> s<sup>-</sup> rsutcs (W rsutcs (W m-0.0e+00 5.0e-03 \_kg rlutcs -0.0e + 0.00.0e+00 vetbc ( -1.0e-02 rsut 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year total deposition rate of BC – SH–sea dry deposition rate of SO2 – SH-sea wet deposition rate dry deposition rate of SO4 – SH-sea wet deposition rate of SO4 – SH-sea of SO2 – SH–sea 3 1e-16 1 0e-15 7 8e-16 2 9e-15 $drybc + wetbc (kg m^{-2} s^{-1})$ 5.0e-06 $dryso2 (kg m^{-2} s^{-1})$ $\rm wetso2~(kg~m^{-2}~s^{-1}$ $dryso4 (kg m^{-2} s^{-1})$ wetso4 (kg $\mathrm{m}^{-2}~\mathrm{s}^{-1}$ 1.0e-16 3.2e-16 0.0e + 0.0e +-3.1e-16 -1 6e-15 -6 2e-16 -5 1e-15 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year dyso2 + wetso2)/2 + (dyso4 + wetso4)/3Ice water path - SH-sea Dimethyl sulphide (DMS) mole fraction total deposition rate of S – SH–sea cloud cover ambient aerosol optical thickness at 550nm – SH–se percentage - SH-sea 1e-02 2e-04 2.5e-06 \_lom lom) smb clivi (kg m<sup>-2</sup>) 0e+00 $(kg m^{-2} s^{-1})$ 양 1e-04 0.0e+00 od550aeı ession -1e-02 0e+00 -5.0e-06 -2e-02 -7.5e-0620002001200220032004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 Year Year Year Year Year load of so2 SO4 lifetime SO2 lifetime load load - SH-sea of so4 - SH-sea of bc - SH-sea - SH-sea - SH-sea wetso4) (days 4e-09 5.0e-10 oadso2/emiso2 (days) loadso4 (kg m<sup>-2</sup>) 2e-09 oadso2 (kg m<sup>-2</sup>) oadbc (kg m<sup>-2</sup>) 0e+00 0.0e+00 (dryso4 + 0.0e+00 -2e-09 -5.0e -4e-09 -5 0e-10 -1.0e-09 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2001 2002 2003 2004 2000 2001 2002 2003 Year Year Year Year Year CAM-ATRAS F3SM GISS modelE

CESM1

**GEOS** 

NorESM2