global: absolute difference surface flux of SO2 – high–so4 surface concentration of BC – high–so4 surface flux of BC – high–so4 surface concentration of SO4 – high–so4 surface concentration of SO2 – high–so4 1.3e-19 1.0e-10 0e+00 6e-13 _1 5e_11 8.9e-20 -1e-13 emibc $(kg m^{-2} s^{-1})$ emiso2 $(kg m^{-2} s^{-1})$ mmrso4 (kg kg – 1) nmrbc (kg kg – 1) so2 (kg kg – 1) -2 0e-1 -2e-13 4.3e-20 -3e-13 -3.1e-21 -3 0e-11 2002 2003 2002 2003 2002 2003 2004 2002 2003 2002 2003 2001 2001 2001 2001 2001 Year Year Year Year Year upwelling longwave flux at TOA – high–so4 upwelling shortwave flux at TOA – high–so4 incident shortwave flux at TOA – high–so4 upwelling clear-sky longwav flux at TOA - high-so4 net radiative flux at TOA - high-so4 1.5e-01 $rlut + rsut (W m^{-2})$ 1.0e-0 rlutcs (W m-2) rlut (Wm-2)rsut(Wm-2)rsdt(Wm-2)2e-02 1e-0 5.0e-02 -2e-01 3.0e-08 0e+00 -2e-01 -3e-010.0e+00 0.0e+00 2003 2003 2003 2001 2003 2002 2003 2001 2002 2002 2001 2002 2001 2001 2002 Year Year Year Year Year dry deposition rate of BC – high–so4 wet deposition rate of BC – high–so4 upwelling clear-sky shortwav clear-sky net radiative implied cloud response flux at TOA - high-so4 flux at TOA - high-so4 at TOA - high-so4 1e-0 rsut - rlutcs - rsutcs (W m⁻²) -2e-02 lutcs + rsutcs (W m^{-2} 5.9e-16 1.2e-15 0e+00 $drybc (kg m^{-2} s^{-1})$ wetbc $(kg m^{-2} s^{-1})$ rsutcs (W m-2) -2e-02 4e-02 -2e-01 -8e-02 2003 2002 2003 2004 2001 2002 2003 2001 2002 2003 2001 2002 2001 2002 2003 2001 Year Year Year Year Year total deposition rate of BC – high–so4 wet deposition rate of SO2 – high–so4 dry deposition rate of SO4 – high–so4 wet deposition rate of SO4 – high–so4 dry deposition rate of SO2 - high-so4 4.2e-16 2.5e-13 $drybc + wetbc (kg m^{-2} s^{-1})$ 2.0e-16 wetso4 $(kg m^{-2} s^{-1})$ wetso2 $(kg m^{-2} s^{-1})$ $dryso4 (kg m^{-2} s^{-1})$ dryso2 (kg m⁻² s⁻¹ -3.0e-14 -1.9e-17 -6.0e-14 -2.0e-13 -1.2e-13 2002 2003 2001 2002 2003 2002 2003 2001 2002 2003 2002 2003 Year Year Year total deposition rate of S – high–so4 ambient aerosol optical thickness at 550nm – high-s convective cloud cover percentage – high–so4 total cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/31e-01 expression(clt~(%) $(kg m^{-2} s^{-1})$ 5e-02 4e-03 0e+00 -5.0e-02 -7.5e-024e-03 2001 2002 2003 2004 2002 2003 2002 2003 2002 2003 Year Year Year Year GISS **GFDI UKESM** CESM1 MIROC E3SM CESM2 NorESM2 OsloCTM3 **GEOS**