global: absolute difference surface flux of BC – so2–no–season surface concentration surface concentration of SO2 – so2–no–seaso surface flux surface concentration of SO2 – so2-no-season of SO4 – so2–no–season of BC - so2-no-season 7 40-18 3e-14 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ emiso2 $(kg m^{-2} s^{-1})$ mmrso4 (kg kg-1) mmrbc (kg kg-1) so2 (kg kg-1) 0e+00 -7.4e-17 1e-14 -8 0e-12 -1e-13 0e+00 0e+00 -3e-13 2002 2003 2002 2003 2002 2003 2002 2003 2002 2003 2001 2001 2001 2001 2001 Year Year Year Year Year upwelling shortwave flux at TOA – so2–no–season upwelling clear-sky longway flux at TOA - so2-no-seas upwelling longwave flux net radiative flux incident shortwave flux at TOA - so2-no-season at TOA - so2-no-season at TOA - so2-no-season 2.5e - 022e-02 5e-02 rlut + rsut $(W m^{-2})$ 0.0e+00 rlutcs (W m-2) rsdt (W m-2) rlut (Wm-2)rsut(Wm-2)0e+00 1e-02 0e+00 0e+00 0e+00 -5e-02 _5 0e_02 _1e_02 -2e-02 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2004 2001 2002 2003 Year Year Year Year Year dry deposition rate of BC – so2–no–season upwelling clear-sky shortwav clear-sky net radiative implied cloud response wet deposition rate flux at TOA - so2-no-seaso flux at TOA - so2-no-sease at TOA - so2-no-season of BC - so2-no-seasor rlutcs - rsutcs (W m⁻²) lutcs + rsutcs (W m^{-2} 0e+00 $drybc (kg m^{-2} s^{-1})$ wetbc $(kg m^{-2} s^{-1})$ 1.6e-16 rsutcs (W m-2) 0e+00 -2e-02 1.0e-16 -2e-02 -2e-02 -3e-02 rsut – -4e-02 -4e-02 -4e-02 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 Year Year Year Year Year total deposition rate dry deposition rate wet deposition rate dry deposition rate wet deposition rate of BC - so2-no-season of SO2 - so2-no-season of SO2 - so2-no-season of SO4 - so2-no-seaso of SO4 - so2-no-seasor 3.2e-16 1.5e-14 1.0e-13 $drybc + wetbc (kg m^{-2} s^{-1})$ 1.1e-16 wetso2 $(kg m^{-2} s^{-1})$ 9.3e-15 wetso4 (kg m⁻² s⁻¹) dryso2 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ dryso4 (kg $m^{-2} s^{-1}$) 0e+00 -1.0e-16 3.9e-15 2.5e-14 -5.2e-16 -6.9e-15 2002 2003 2001 2002 2003 2002 2003 2001 2002 2003 2002 2003 Year Year Year Year total deposition rate ambient aerosol optical total cloud cover convective cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3thickness at 550nm - so2-no-s percentage - so2-no-seaso percentage - so2-no-season 0.0e+00 5.0e-03 2e-14 expression(clt~(%) -2.5e-02 $(kg m^{-2} s^{-1})$ 1e-14 0e+00-5.0e-02 0e+00 -5e-02 -7.5e-02 2001 2002 2003 2004 2002 2003 2002 2003 Year Year Year Year **UKESM** CESM1 GISS MIROC **GFDI** E3SM NorESM2 OsloCTM3 **GEOS**