global: absolute difference surface flux of SO2 – so2–no–season surface flux of BC – so2–no–season surface concentration of SO4 – so2–no–season surface concentration of SO2 – so2–no–season surface concentration of BC - so2-no-season 0e+00 4e-01 1e-01 0e+00 ∆ emibc ∆ emiso2 ∆ mmrbc -1e-01 -2e-02 0e+00 -2e-01 _3e_01 2002 2003 2002 2002 2003 2002 2003 2001 2002 2003 2001 2003 2004 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-seaso upwelling longwave flux net radiative flux incident shortwave flux at TOA - so2-no-season at TOA - so2-no-season at TOA - so2-no-season 3e-08 6e-02 2e-02 2e-08 0e+00 Δ rlutcs 4e-02 ∆ rsut 1e-08 ∆ rlut + 0e+00 2e-02 -5e-03 0e+00 0e+00 0e+00 -1e-08 -1e-02 2003 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2004 2001 2002 Year Year Year Year Year dry deposition rate of BC – so2–no–season upwelling clear-sky shortway clear-sky net radiative implied cloud response wet deposition rate flux at TOA - so2-no-seaso flux at TOA - so2-no-seaso at TOA - so2-no-season of BC - so2-no-season 2e-01 rsutcs 2e-01 2e-02 7.5e-02 7.5e-02 ∆ rlutcs + rsutcs rlut + rsut - rlutcs - $1e-0^{\circ}$ 0e+00 1e-01 ∆ wetbc ∆ drybc 5.0e-02 0e+00 2.5e-02 -4e-02 -1e-01 2001 2002 2003 2001 2002 2003 2001 2003 2001 2002 2003 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-seasor of SO4 - so2-no-season 1e+00 1e+00 1e-01 5e-01 1.0e+00 drybc + wetbc -5e-01 ∆ dryso2 ∆ wetso2 ∆ dryso² 0e+00 0e+00 5.0e-01 6e-01 -5e-01 -1e-014e-01 -5.0e-01 2003 2003 2002 2003 2002 2003 2001 2003 Year Year total deposition rate ambient aerosol optical total cloud cover convective cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3of S - so2-no-season thickness at 550nm - so2-no-se percentage - so2-no-seaso percentage - so2-no-season 0e+00 1e-01 4e-01 -2e+01 0e+00 -4e+01 0e+00-6e+01 -1e-01 -4e-01 2001 2002 2003 2004 2002 2003 2002 2003 Year Year Year Year **UKESM** CESM1 GISS MIROC **GFDI** E3SM NorESM2 OsloCTM3 **GEOS**