sea: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - so2-no-season of SO2 - so2-no-season of BC - so2-no-season of SO4 - so2-no-seasor of SO2 - so2-no-season 00+00 2e-01 ∆ emibc 00+00 0.00+00 $\Delta so2$ 4e-01 _2e_01 -4e-03 0e+00 -3e+00 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 upwelling clear-sky longway flux at TOA - so2-no-seaso net radiative flux upwelling longwave flux upwelling shortwave flux incident shortwave flux at TOA – so2-no-season at TOA – so2–no–season at TOA - so2-no-season at TOA - so2-no-season 4e-01 2e-02 3e-01 0e+00 2e-01 2e-01 0e+00 1e-0 1e-01 -2e-02 0e+00 0e+00-2e-08 2002 2003 2004 2002 2003 2004 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 Year Year Year Year Year dry deposition rate of BC – so2–no–season upwelling clear-sky shortwave 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 rsutcs) 2e_01 rsutcs rlutcs -2e-01 ∆ wetbc Δ rsutcs 2e-01 0e+005e-02 ∆ rlutcs + rsut – 1e-01 1e-01 -3e-01 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year wet deposition rate dry deposition rate of SO4 – so2–no–seasor wet deposition rate of SO4 – so2–no–season total deposition rate dry deposition rate of SO2 – so2–no–seasor of BC - so2-no-season of SO2 - so2-no-seasor -5.0e-01 0.0e + 0.0∆ drybc + wetbc 3e-01 $-5.0e-0^{\circ}$ 0e+00 0e+00 _2e_01 -1.5e+00-3e-01-6e-01 -2.0e+00 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 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - so2-no-sea convective cloud cover - so2-nosurface cloud cover - so2-no-so of S - so2-no-season thickness at 550nm - so2-no-s 0e+001e-01 -1e+00 -2e+01 ㅎ ا کا کا 0e+00-4e+01-2e+00 -5e-02 0e+00 -1e-01-3e+00 -1e-01 -2e-01 20002001200220032004 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 ice water path - so2-no-seas surface concentration column mass burden column mass burden column mass burden of DMS - so2-no-season of BC - so2-no-season of SO2 - so2-no-season of SO4 - so2-no-season 3e+00 1e-01 2e-01 2e+00 ∆ clivi 1e+00 0e+00 5e+00 -1e+00 -2e-01 -2e-01 0e+00 -6e-01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year CAM5 E3SM OsloCTM3

CESM1

CESM2

GEOS

GFDL

MIROC

NorESM2

UKESM