so2-no-season: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - land of SO2 - land of BC - land of SO4 - land of SO2 - land 00+00 -1e+00 -1e-02 0e+00 mmrs04 ∆ mmrbc -2e+00 -2e-02 -2e-01 -3e+00 0e+00 0e+00 -3e-024e+00 -4e-01 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 longwave flux at TOA – land upwelling shortwave flux at TOA – land upwelling clear-sky longwav flux at TOA - land net radiative flux incident shortwave flux at TOA – land at TOA – land 5e-01 5e-08 4e-01 2e-02 0e+00 3e-01 ∆ rlut 3e-01 rlut + 2e-01 1e-01 _5e_08 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 Year Year Year Year upwelling clear-sky shortwave flux at TOA - land clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - land at TOA - land of BC - land of BC - land rsutcs) 3e-01 5.0e-01 5e-01 5.0e-02 rsutcs 4e-01 rlutcs -2.5e-01 4e-01 2.5e-02 3e-01 2e-01 1e-0'∆ rlutcs + 0.0e+00 00+00 2e-01 rsut--01 -2e-01 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 dry deposition rate of SO4 – land wet deposition rate of SO4 – land dry deposition rate wet deposition rate total deposition rate of BC - land of SO2 - land of SO2 - land 2e+00 2.5e-01 2.5e+00 ∆ dryso4 0e+00 2.0e+00 0e+00 0.0e + 0.0e +-2e+00 -1e+00 1.0e+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 Yea Year Year $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate of S – land ambient aerosol optical total cloud cover - land convective cloud cover - lan surface cloud cover - land thickness at 550nm - land 1e-01 2e-01 0e+00 1e-01 -2e+01 ∆ od550ae ∆ ct ا کا کا 5.0e+00 -4e+01 -1e-01 2.5e-01 2.5e+00 -1e-01 -6e+01 -2e-01 0.0e+00 0.0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 20002001200220032004 2000 2001 2002 2003 2004 Year Year Year Year Year ice water path - land surface concentration column mass burden column mass burden column mass burden of DMS - land of BC - land of SO2 - land of SO4 - land 1e+00 1e+00 1e+00 5e-01 -01 ∆ clivi oadso₄ 5e-01 5.0e+00 -1e+000e+000e+00 -5e-01 -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 Year Year Year Year

CAM5

CESM1

CESM2

E3SM

GEOS

GFDL

GISS

MIROC

NorESM2

OsloCTM3

UKESM