so2-no-season: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - NH-land of SO2 - NH-land of BC - NH-land of SO4 - NH-land of SO2 - NH-land 00+00 30+00 _1e_02 4e-01 mmrso4 0.0e+0.0-2e+00-2e-02 2e-01 1e+00 -3e+00 0e+00 0e+00 -4e+00 -4e-02 -5.0e-01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 Year upwelling longwave flux at TOA – NH–land upwelling shortwave flux at TOA – NH–land net radiative flux at TOA – NH–land upwelling clear-sky longwav flux at TOA - NH-land incident shortwave flux at TOA - NH-land 5e-02 5e-08 6e-01 2e-02 0e+00 00+00 4e-01 0e+00 2e-01 2e-01 -5e-08 -2e-02 -1e-01 00+00 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2001 2000 Year Year Year Year dry deposition rate of BC – NH–land upwelling clear-sky shortway flux at TOA - NH-land clear-sky net radiative flux at TOA - NH-land wet deposition rate of BC – NH–land implied cloud response at TOA - NH-land rsutcs) 4e-01 7.5e-01 2.5e-01 rlutcs -0e+00 2e-01 5.0e-01 5.0e-01 0.0e+00rlutcs 0e+00 rsut $-1e-0^{\circ}$ 2.5e-01 2 5e_01 -2.5e-01 -2e-01 _5 0e_01 0.0e+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 total deposition rate of BC – NH–land dry deposition rate of SO2 – NH–land dry deposition rate of SO4 – NH–land wet deposition rate of SO2 – NH–land wet deposition rate of SO4 – NH–land 3.0e+00 3e+00 2e+00 2.5e+00 2.5e-01 1e+00 dryso4 0e+00 2.0e+00 0.0e+00 0e+00 -2e+00 1.5e+00 -2.5e-01 4e+00 1 00+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 Yea $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - NH-land convective cloud cover - NH-Ia surface cloud cover - NH-lar of S - NH-land thickness at 550nm - NH-la 8e+00 6e+00 ∆ od550aeı -2e+01∆ clt -1e-01 <u>\</u> 4e+00 0e+00 -2e-01 2e+00 -2e-01 -6e+01 0e+00 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 - NH-land column mass burden column mass burden column mass burden surface concentration of DMS - NH-land of BC - NH-land of SO2 - NH-land of SO4 - NH-land 1e+00 2.5e-01 7.5e+00 1e-01 oadso₄ 0.0 0e+00-1e+00 5.0e+00 -01 -2e+00 -2e-01 -5.0e-01 -3e+00 -3e-01 -8e-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 Year Year Year Year

CAM5

CESM1

CESM2

E3SM

GEOS

GFDL

GISS

MIROC

NorESM2

OsloCTM3

UKESM