## so2-no-season: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - SH-land of SO2 - SH-land of BC - SH-land of SO4 - SH-land of SO2 - SH-land 5e-03 46\_03 8.0e-01 2e-01 3e-03 ∆ mmrbc 4.0e-01 2e 0e+00 -2e+00 -3e+00 1e-03 0.0e+00 -2e-01 -4e+00\_40+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 upwelling longwave flux at TOA – SH–land upwelling shortwave flux at TOA – SH–land upwelling clear-sky longwa flux at TOA - SH-land net radiative flux incident shortwave flux at TOA – SH–land at TOA - SH-land 2e-01 1e-07 5.0e-02 5.0e-02 rsut 5e-08 1e-01 ∆ rsut 0.0e+00 5 0e-02 ∆ rlut + 0e+00 0e+00 -5.0e-02 0.0e+00 -5e-08 0.0e+00-1e-01 -1e-07-1.5e-0 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year dry deposition rate of BC – SH–land upwelling clear–sky shortway flux at TOA – SH–land wet deposition rate of BC – SH–land clear-sky net radiative implied cloud response flux at TOA - SH-land at TOA - SH-land rsutcs) 1e-01 1.0e-01 2e-01 5.0e-02 rlutcs -∆ wetbc 1e-01 0e+00 rsut – -1e-01 0e+00 -5e-01 -1.0e-01 -4e-01 -1.5e-0° 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 total deposition rate of BC – SH–land dry deposition rate of SO4 – SH-land wet deposition rate of SO4 – SH-land dry deposition rate wet deposition rate of SO2 - SH-land of SO2 - SH-land 1.5e+01 ∆ drybc + wetbc 5e-01 -1e+00 1.0e+01 5.0e+00 0e+00 0e+00 5.0e+00 2.5e+00 -5e-01 -1e+00 0.0e + 002000 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 - SH-land convective cloud cover - SHsurface cloud cover - SH-lan of S - SH-land thickness at 550nm - SH-lai 3e+01 1e+00 0.0e+00 2e+01 픙 <u>\</u> 1e+01 0e+00 -2e-01 -6e+01 -4e-01 -5.0e-01 20002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year ice water path - SH-land surface concentration column mass burden column mass burden column mass burden of DMS - SH-land of BC - SH-land of SO2 - SH-land of SO4 - SH-land 2e+00 1e+00 1.0e+01 1e+00 7.5e+0.0∆ clivi 5.0e-01 0.0e+00 5.0e+00 0e+00 -1e+00 0.0e+00 2.5e+00 -1e+00 -5.0e-01 0.0e+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 Year Year Year Year

CAM5

CESM1

CESM2

E3SM

**GEOS** 

GFDL

**GISS** 

MIROC

NorESM2

OsloCTM3

**UKESM**