## Reference - absolute SH-land averages surface flux of SO2 - SH-lan surface concentration of BC – SH–land surface flux of BC - SH-lar surface concentration of SO4 – SH-land surface concentration of SO2 – SH–land 1.20e-12 emiso2 (kg m-2 s-1) emibc (kg m-2 s-1) mmrbc (kg kg-1) kg P so2 (kg kg-1) nmrso4 (kg 8.0e-10 6e-10 8e-12 5e-10 1.05e-12 1.00e-12 2002 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2003 Year Year Year Year Year upwelling longwave flux at TOA – SH–land upwelling shortwave flux at TOA – SH–land incident shortwave flux at TOA – SH–land upwelling clear-sky longwave flux at TOA - SH-land net radiative flux at TOA - SH-la 370 337 230 rlut + rsut (W m-2) 140 336 rlutcs (W m-2) 360 rsdt (W m-2) rlut (W m-2) rsut (W m-2) 225 130 247.5 335 350 220 245.0 334 2001 2003 2001 2003 2001 2003 2001 2003 2002 2003 Year Year Year Year Year dry deposition rate of BC – SH–land upwelling clear-sky shortwave clear-sky net radiative wet deposition rate total deposition rate flux at TOA - SH-land of BC - SH-land flux at TOA - SH-land of BC - SH-land drybc + wetbc (kg m-2 s-1) rlutcs + rsutcs (W m-2) drybc (kg m-2 s-1) wetbc (kg m-2 s-1) rsutcs (W m-2) 8e-13 80 325 2003 2001 2003 2001 2002 2003 2001 2001 2003 2001 2002 2003 Year Year Year Year Year (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3 (kg m-2 s-1) wet deposition rate of SO4 – SH–land total deposition rate of S – SH–land dry deposition rate of SO4 – SH–land dry deposition rate wet deposition rate of SO2 - SH-land of SO2 - SH-land dryso2 (kg m-2 s-1) wetso2 (kg m-2 s-1) dryso4 (kg m-2 s-1) wetso4 (kg m-2 s-1) 2e-12 2.0e-12 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 Year Year ambient aerosol optical convective cloud cover total cloud cover thickness at 550nm - SH-land percentage - SH-land 64 60 15 od550aer cltc (%) clt (%) 0.12 0.09 52 48 2003 2002 2003 2002 2003 2004 2002 2001 2004 2001 2001 2004 Year Year Year

CFSM1

CESM2

F3SM

**GEOS** 

**GFDI** 

**GISS** 

MIROC

NorESM2

OsloCTM3

**UKESM**