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 1e-09 emiso2 (kg m-2 s-1) emibc (kg m-2 s-1) mmrso4 (kg kg-1) mmrbc (kg kg-1) so2 (kg kg-1) 8e-12 6e-10 1.05e-12 7e-12 1.00e-12 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 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) 250.0 140 360 336 rlutcs (W m-2) rsdt (W m-2) rlut (W m-2) rsut (W m-2) 225 247.5 130 335 350 220 245 0 334 242 5 2001 2003 2001 2003 2001 2003 2001 2003 2002 2003 Year Year Year Year Year dry deposition rate of BC – SH–land wet deposition rate of BC – SH–land upwelling clear-sky shortwave clear-sky net radiative total deposition rate flux at TOA - SH-land flux at TOA - SH-land of BC - SH-land drybc + wetbc (kg m-2 s-1) rlutes + rsutes (W m-2) drybc (kg m-2 s-1) rsutcs (W m-2) wetbc (kg m-2 81 325 78 320 2003 2001 2003 2001 2002 2003 2001 2003 2001 2001 2003 Year Year Year Year Year (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3 (kg m-2 s-1)dry deposition rate of SO4 – SH–land total deposition rate of S – SH–land wet 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) (kg m-2 s-1 1.0e-12 8.0e-13 7.50e-12 6.0e-13 5.00e-12 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 Year Year Year ambient aerosol optical thickness at 550nm – SH-land convective cloud cover percentage – SH-land total cloud cover 0.12 od550aer cltc (%) clt (%) 55.0 0.08 0.04 2002 2003 2004 2002 2003 2004 2001 2003 2004 2001 2002 2001 Year Year Year

OsloCTM3

CESM1

E3SM

GFDI

GISS

MIROC

NorESM2