Reference – absolute SH-sea averages surface concentration of BC – SH–sea surface flux of BC - SH-sea surface flux of SO2 - SH-sea surface concentration of SO4 – SH–sea surface concentration of SO2 – SH–sea 1.6e-11 5e-12 emibc (kg m-2 s-1) emiso2 (kg m-2 s-1) 2.0e-10 mmrso4 (kg kg-1) nmrbc (kg kg-1) 4e-12 so2 (kg kg-1) 3.0e-10 2e-12 2e-14 1.0e-10 2003 2002 2003 2001 2002 2003 2001 2002 2001 2002 2003 2001 2002 2003 2001 Year Year Year Year Year upwelling longwave flux at TOA – SH-sea upwelling shortwave flux at TOA – SH-sea incident shortwave flux at TOA – SH–sea upwelling clear-sky longwave flux at TOA - SH-sea net radiative flux at TOA - SH-se 270.0 341.5 rlut + rsut (W m-2) 100 345 245.0 rlut (W m-2) rlutcs (W m-2) 267.5 rsut (W m-2) rsdt (W m-2) 341.0 95 265.0 340.5 90 335 262.5 240.0 340.0 2001 2002 2003 2001 2002 2003 2001 2003 2001 2003 2001 2002 2003 Year Year Year Year Year dry deposition rate of BC – SH–sea wet deposition rate of BC – SH–sea total deposition rate of BC – SH–sea upwelling clear-sky shortwave clear-sky net radiative flux at TOA - SH-sea flux at TOA - SH-sea 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) 42 41 305 8.0e-14 40 6.0e 39 300 3 0e-14 2003 2003 2003 2001 2003 2001 2002 2001 2004 2001 2002 2003 2002 Year Year Year Year Year + wetso4)/3 (kg m-2 s-1) dry deposition rate of SO4 – SH-sea wet deposition rate of SO4 – SH-sea wet deposition rate of SO2 – SH-sea dry deposition rate total deposition rate of SO2 - SH-sea of S - SH-sea dryso2 (kg m-2 s-1) wetso2 (kg m-2 s-1) wetso4 (kg m-2 s-1) dryso4 (kg m-2 s-1) 3e-12 3.0e-12 1.0e-12 (dryso2 + wetso2)/2 + (dryso4 2.0e-12 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 Year Year Year Year ambient aerosol optical thickness at 550nm – SH-se convective cloud cover total cloud cover percentage - SH-sea percentage - SH-sea 70 0.125 40 od550aer cltc (%) clt (%) 0.100 20 0.075 60 0 2002 2003 2002 2003 2002 2003 2004 2004 2004 2001 2001 2001 Year Year Year

CFSM1

CESM2

F3SM

GEOS

GFDI

GISS

MIROC

NorESM2

OsloCTM3

UKESM