Reference - absolute NH-sea averages surface concentration of BC – NH–sea surface concentration of SO4 – NH–sea surface flux of BC - NH-sea surface flux of SO2 - NH-sea surface concentration of SO2 – NH–sea 2.0e-13 emiso2 (kg m-2 s-1) emibc (kg m-2 s-1) mmrbc (kg kg-1) 1.5e-13 so2 (kg kg-1) mmrso4 (kg 40-12 2001 2002 2003 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 Year Year Year Year Year upwelling longwave flux at TOA – NH–sea upwelling shortwave flux at TOA – NH-sea incident shortwave flux at TOA – NH–sea upwelling clear-sky longwave flux at TOA - NH-sea net radiative flux at TOA - NH-s 350 249 rlut + rsut (W m-2) 345 246 354 rlutcs (W m-2) rlut (W m-2) rsdt (W m-2) rsut (W m-2) 95 270 353 90 267 240 352 85 2001 2003 2001 2003 2001 2003 2001 2003 2001 2002 2003 Year Year Year Year Year dry deposition rate of BC – NH–sea wet deposition rate of BC – NH–sea upwelling clear-sky shortwave clear-sky net radiative total deposition rate flux at TOA - NH-sea flux at TOA - NH-sea of BC - NH-sea 1.6e-13 drybc + wetbc (kg m-2 s-1 rlutcs + rsutcs (W m-2) wetbc (kg m-2 s-1) drybc (kg m-2 s-1) 45 rsutcs (W m-2) 315 43 2e-13 305 2003 2003 2001 2003 2001 2002 2001 2002 2001 2003 2001 2003 Year Year Year Year Year wetso4)/3 (kg m-2 s-1) dry deposition rate of SO2 – NH-sea dry deposition rate of SO4 – NH–sea wet deposition rate of SO4 – NH–sea total deposition rate of S – NH–sea wet deposition rate of SO2 - NH-sea 6e-12 dryso2 (kg m-2 s-1) wetso2 (kg m-2 s-1) dryso4 (kg m-2 s-1) wetso4 (kg m-2 s-1 5e-12 + (dryso4 + 4e-12 5.00e-12 (dryso2 + wetso2)/2 2e-12 8.0e-13 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2002 2003 Year Year Year Year ambient aerosol optical thickness at 550nm – NH–sea convective cloud cover total cloud cover percentage - NH-sea 0.17 69 0.15 od550aer % clt (%) 0.13 cltc 63 0.1 60 2002 2003 2002 2003 2004 2002 2003 2004 2004 2001 2001 2001 Year Year Year

CFSM1

CESM2

F3SM

GEOS

GFDI

GISS

MIROC

NorESM2

OsloCTM3

UKESM