so2-at-height: percent difference surface flux of BC – sea surface flux of SO2 – sea surface concentration of BC – sea surface concentration of SO4 – sea surface concentration of SO2 – sea 6e-06% 0.25% 6% 15% 3e-06% 0% 0% ∆ emiso2 ∆ mmrbc ∆ mmrso4 4% ∆ emibc $\Delta so2$ 0% -0.25% 2% -0.5% -20% 0% 2003 2001 2002 2003 2001 2002 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 Year Year Year Year Year clear–sky longwave flux at TOA – sea longwave flux at TOA shortwave flux at TOA net radiative flux incident shortwave flux at TOA - sea at TOA - sea sea sea 0.02% 0.4% 0.4% 0.3% 0% 0.3% 1e-08% ∆ (rlut + rsut) ∆ rsut ∆ rsdt 0.2% 0.2% 0% -0.01% 0.1% -0.04% -1e-08% 0% -0.02% 2001 2002 2003 2001 2003 2001 2003 2001 2002 2003 2004 2002 2003 2004 Year Year Year Year Year clear-sky shortwaveflux clear-sky net radiative implied cloud response dry deposition rate wet deposition rate at TOA - sea flux at TOA - sea at TOA - sea of BC - sea of BC - sea 0.6% 1% (rlut + rsut - rlutcs - rsutcs) 0% 0.2% 0.4% Δ (rlutcs + rsutcs) 0.75% 0.75% -0.2% ∆ rsutcs ∆ wetbc △ drybc 0.2% 0.5% 0.5% -0.4% 0% 0.25% 0.25% -0.4% -0.6% -0.2%-0.6% 0% 0% 2003 2001 2003 2001 2002 2001 2002 2003 2001 2003 2001 2003 Year Year Year Year Year total deposition rate dry deposition rate wet deposition rate dry deposition rate wet deposition rate of BC - sea of SO2 - sea of SO2 - sea of SO4 - sea of SO4 - sea 12.5% 10% ∆ (drybc + wetbc) 0.5% ∆ dryso2 ∆ wetso2 ∆ dryso4 ∆ wetso4 10% 7.5% 0% 5% 5% 5% -5% 2.5% 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 Year Year total deposition rate $\Delta (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3$ ambient aerosol optical total cloud cover convective cloud cover thickness at 550nm - sea percentage - sea percentage - sea 20% 0% 6e+35% -20% ∆ od550aer 4e+35% 0.05% 10% 2e+35% 0% -60% -0.05% 0% -80% 2002 2003 2002 2003 2001 2003 2001 2004 2001 2002 2003 2004 2001 2004 2002 2004 Year Year Year Year

OsloCTM3

UKESM

CFSM1

E3SM

GFOS

GISS

MIROC

NorESM2