so2-at-height: percent difference surface flux of SO2 – global surface flux of BC – global surface concentration surface concentration of SO4 – global surface concentration of SO2 – global of BC – global 1.5e-05% 25% 20% 3% 1e-05% _20% -0.5% ∆ emiso2 ∆ mmrbc ∆ mmrso4 15% ∆ emibc 5e-06% 0% -1.5% -60% 2003 2001 2002 2003 2001 2002 2003 2001 2002 2001 2002 2003 2001 2002 2003 Year Year Year Year Year clear-sky longwave flux at TOA - global longwave flux at TOA shortwave flux at TOA net radiative flux incident shortwave flux at TOA – global global global at TOA - global 0.02% 0.4% 2e-08% 0.3% 0.3% 0% 1e-08% ∆ (rlut + rsut) 0.2% -0.02% 0.1% 0.1% -1e-08% -0.02% -0.04% 0% 0% -2e-08% 2001 2003 2001 2002 2003 2001 2002 2003 2002 2003 2002 2003 Year Year Year Year Year clear-sky shortwaveflux clear-sky net radiative implied cloud response dry deposition rate wet deposition rate at TOA - global flux at TOA - global at TOA - global of BC - global of BC - global 0.5% 0.5% rsutcs 0% 0.9% ∆ (rlutcs + rsutcs) ∆ (rlut + rsut - rlutcs -0.25% 0.25% -0.2% ∆ rsutcs △ wetbc ∆ drybc 0.6% 0.6% -0.4% 0% 0% 0.3% 0.3% -0.6% -0.25%0% 0% -0.25% 2003 2003 2003 2001 2002 2001 2002 2001 2003 2001 2002 2003 Year Year Year Year Year dry deposition rate of SO2 – global dry deposition rate of SO4 – global wet deposition rate of SO4 – global total deposition rate of BC – global wet deposition rate of SO2 – global -10% 0.4% 20% ∆ (drybc + wetbc) ∆ dryso2 ∆ wetso2 ∆ dryso4 ∆ wetso4 0.2% 0% 5% 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 Year Year total deposition rate of S – global ambient aerosol optical $\Delta \left(\text{dryso2} + \text{wetso2} \right) / 2 + \left(\text{dryso4} + \text{wetso4} \right) / 3$ total cloud cover convective cloud cover thickness at 550nm - global percentage - global percentage - global 20% 8e+35% 6e+35% 0.05% ∆ od550ae 10% -20% 4e+35% -40% -0.05% 0% 2e+35% -60% -0.1% 0% 2002 2003 2003 2002 2003 2001 2002 2003 2001 2004 2002 2004 2001 2004 2004 2001 Year Year Year Year

CFSM1

E3SM

GFOS

GISS

MIROC

NorESM2

OsloCTM3

UKESM