global: absolute difference surface flux surface flux surface concentration surface concentration surface concentration of BC - so2-at-height of SO2 - so2-at-height of BC - so2-at-height of SO4 - so2-at-height of SO2 - so2-at-height 2.5e+01 4e+00 2e-05 0.0e+00 3e+00 2.0e+01 -2e+01 -5 0e-01 1e-05 ∆ emiso2 2e+00 ∆ emibc $\Delta so2$ -1.0e+00 1e+00 00+00 0e+00 5.00+00 -2.0e+00 _6e+01 -1e+00 0.0e + 002002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year upwelling longwave flux at TOA – so2–at–height upwelling clear-sky longwav flux at TOA - so2-at-heigh upwelling shortwave flux at TOA – so2–at–height net radiative flux incident shortwave flux at TOA - so2-at-height at TOA - so2-at-height 5e-01 4e-08 2e-02 40_01 4e-01 2e-02 1e-02 3e-01 2e-08 3e-01 2e-01 0e+00 -2e-02 -1e-02 1e-01 -2e-08 -4e-02 -2e-02 0e+00 0e+00 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2000 2001 Year Year Year Year Year upwelling clear–sky shortwave flux at TOA – so2–at–height clear-sky net radiative flux at TOA - so2-at-height implied cloud response dry deposition rate wet deposition rate at TOA - so2-at-height of BC - so2-at-height of BC - so2-at-height 5.0e-01 rsutcs 9e-01 ∆ rlutcs + rsutcs 2.5e-01 rlutcs -2e-01 2e-01 ∆ drybc 6e-01 6e-01 rlut + rsut --4e-01 0.0e+00 0e+00 3e-01 0e+00 0e+00 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year total deposition rate dry deposition rate wet deposition rate dry deposition rate wet deposition rate of BC - so2-at-height of SO2 - so2-at-height of SO2 - so2-at-height of SO4 - so2-at-height of SO4 - so2-at-height 4e-01 drybc + wetbc 2e+01 2e-01 -2e+01 ∆ wetso2 ∆ dryso2 ∆ dryso4 0e+00 1.0e+01 -3e+01 1e+01 -2e-01 5.0e+00 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year total deposition rate ambient aerosol optical total cloud cover convective cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3of S - so2-at-height thickness at 550nm - so2-at-h percentage - so2-at-heigh percentage - so2-at-height 8e+35 1e-01 0e+00 -2e+01 1e+01 0e+00 4e+35 -4e+01 0e+00 2e+35 -6e+01 -1e-01 0e+00 20002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2001 2002 2003 2004 2000 Year Year Year Year

CAM-ATRAS

CESM

CESM2

E3SM

GEOS

GFDL-ESM4

GISS modelE

NorESM2

MIROC-SPRINTARS

OsloCTM3

UKESM1