## so2-at-height: absolute difference surface flux of SO2 – global surface concentration of SO4 – global surface flux of BC surface concentration surface concentration of SO2 – global global 8.0e-20 0.0e+00 2.0e-10 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ emiso2 $(kg m^{-2} s^{-1})$ nmrbc (kg kg<sup>-1</sup>) nmrso4 (kg kg¯ so2 (kg kg<sup>-</sup>1 1.9e-20 1.0e-10 0e+00 5.0e-11 -8e-10 2002 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2003 2001 2002 2003 Year Year Year Year Year incident shortwave flux at TOA – global clear-sky longwave flux at TOA - global longwave flux at TOA shortwave flux at TOA net radiative flux global global at TOA - global 8e-08 0.0 0.10 0.050 $rlut + rsut (W m^{-2})$ 4e-08 rlutcs (W m<sup>-2</sup>) rlut $(W m^{-2})$ $rsut(Wm^{-2})$ $rsdt (W m^{-2})$ 0.05 0e+00 -0.2 0.025 0.00 -0.3 -0.3 0.000 -0.4 -0.052002 2003 2001 2003 2001 2003 2001 2002 2003 2001 2002 2003 Year Year Year Year Year clear-sky shortwave flux at TOA - global clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - global at TOA - global of BC - global of BC - global 1.1e-15 8.0e-16 rlut + rsut – rlutcs – rsutcs (W m $^{-2}$ ) 0.0 rlutcs + rsutcs (W m<sup>-2</sup>) -0.1 6.9e-16 3.3e-16 $drybc (kg m^{-2} s^{-1})$ wetbc $(kg m^{-2} s^{-1})$ $rsutcs (W m^{-2})$ -0.2 -0.2 0.0 3.2e-16 -0.3 -0.4 -0.1 -0.4-0.2 2001 2002 2003 2001 2002 2003 2001 2003 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 wet deposition rate of SO2 – global of BC - global 7.6e-16 -5.0e-13 $drybc + wetbc (kg m^{-2} s^{-1})$ wetso4 $(kg m^{-2} s^{-1})$ wetso2 $(kg m^{-2} s^{-1})$ 4.3e-16 $dryso2 (kg m^{-2} s^{-1})$ $dryso4 (kg m^{-2} s^{-1})$ 1.1e-16 -2.1e-16 0e+00 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 Year Year total deposition rate of S – global ambient aerosol optical total cloud cover convective cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3thickness at 550nm - globa percentage - global percentage - global 0.000 0.05 $(kg m^{-2} s^{-1})$ -0.025 2e+35 양 -0.050 1e+35 -0.05 -0.075 0e+00 2001 2002 2003 2004 2002 2003 2003 2004 2001 2004 2001 2002 2001 2002 2003 2004 Year Year Year Year

CFSM1

E3SM

**GFOS** 

**GISS** 

MIROC

NorESM2

OsloCTM3

**UKESM**