## bc-no-season: absolute difference surface flux of SO2 – global surface concentration of SO2 – global surface flux of BC surface concentration surface concentration of SO4 – global global 0.0e+00 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ emiso2 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ ) -2.5e-10 nmrbc (kg kg<sup>-1</sup>) mmrso4 (kg kg<sup>-</sup> so2 (kg kg<sup>\_′</sup> -8.1e-16 2003 2004 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 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 0.3 0.05 0.025 6e-08 -lut + rsut $(W m^{-2})$ 0.2 rlutcs (W m<sup>-2</sup>) rlut $(W m^{-2})$ 0.00 $rsut(Wm^{-2})$ $rsdt (W m^{-2})$ 0.000 4e-08 0.1 -0.025 -0.05 0.0 -0.050-0.1 -0.075 2001 2003 2004 2001 2002 2003 2001 2003 2002 2003 2001 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 2.6e-16 6.1e-15 rlut + rsut – rlutcs – rsutcs (W m $^{-2}$ ) 0.3 0.02 0.2 rlutcs + rsutcs (W m<sup>-2</sup>) 3.1e-15 0.2 wetbc $(kg m^{-2} s^{-1})$ drybc (kg $m^{-2} s^{-1}$ ) $rsutcs (W m^{-2})$ 0.00 0.1 5.2e-17 -0.02 -0.04 0.0 0.0 -0 -5 2e-1 2001 2002 2003 2001 2002 2003 2001 2003 2001 2003 2001 2003 Year Year Year Year Year dry deposition rate of SO4 – global wet deposition rate of SO4 – global total deposition rate dry deposition rate wet deposition rate of BC - global of SO2 – global of SO2 – global 1.2e-15 4.8e-15 5.6e-15 drybc + wetbc (kg m<sup>-2</sup> s<sup>-1</sup>)wetso2 $(kg m^{-2} s^{-1})$ $dryso2 (kg m^{-2} s^{-1})$ -1.6e-15 $dryso4 (kg m^{-2} s^{-1})$ wetso4 (kg m<sup>-2</sup> s<sup>-1</sup>) 1.0e-13 -4.4e-15 6.9e-16 -3.0e-15 0.0e + 0.0-9.9e-15 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 Year total deposition rate ambient aerosol optical convective cloud cover total cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3of S - global thickness at 550nm - globa percentage - global 1.0e-13 0.000 7.5e-14 -0.025 -0.025 $(kg m^{-2} s^{-1})$ clt (%) 5.0e-14 -0.050 -0.050 -0.052.5e-14 -0.075 -0.075 0.0e + 00-0.10 -0.100 2001 2002 2003 2004 2002 2003 2002 2003 2004 2002 2003 2001 2004 2001 2001 2004 Year Year Year Year

CFSM1

CESM2

F3SM

**GEOS** 

**GFDI** 

**GISS** 

MIROC

NorESM2

OsloCTM3

**UKESM**