## no-so4: percent difference surface flux of BC – land surface flux of SO2 – land surface concentration of BC – land surface concentration of SO4 – land surface concentration of SO2 – land 1.5e-05% 0.5% 1e-05% -6% 5e-06% ∆ emiso2 ∆ mmrbc ∆ mmrso4 ∆ emibc $\Delta so2$ -8% 0% 2.5% -5e-06% -0.25% -1e-05% 0% -0.5% 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 Year Year Year Year Year net radiative flux at TOA – land clear-sky longwave flux at TOA - land longwave flux at TOA shortwave flux at TOA incident shortwave flux at TOA - land land land 0.075% 0.02% 0% 6e-08% 0.01% 0.05% ∆ (rlut + rsut) -0.1% -0.1% ∆ rlutcs 0% ∆ rsut 3e-08% 0.025% -0.01% -0.2% -0.2% 0% 0% -0.02% -0.3% -3e-08%2001 2003 2001 2003 2001 2002 2003 2001 2002 2003 2001 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 - land flux at TOA - land at TOA - land of BC - land of BC - land 0.15% 0.5% $\Delta$ (rlut + rsut - rlutcs - rsutcs) 0.1% 0.4% 0.25% ∆ (rlutcs + rsutcs) 0.05% 0.05% ∆ rsutcs 0% △ wetbc 0% △ drybc 0% -0.4% -0.25% -0.05% -0.05% -0.8% -0.5% -0.1% -0.1%-0.7592003 2002 2003 2004 2001 2002 2001 2003 2001 2003 2001 2002 2003 2001 Year Year Year Year Year total deposition rate dry deposition rate wet deposition rate dry deposition rate wet deposition rate of BC - land of SO2 - land of SO2 - land of SO4 – land of SO4 – land 0.5% ∆ (drybc + wetbc) 0% ∆ wetso2 ∆ dryso2 ∆ dryso4 ∆ wetso4 2.5% -15% 2 4% -0.5% 2.3% 1.5% 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 Year Year total deposition rate $\Delta (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3$ ambient aerosol optical convective cloud cover total cloud cover thickness at 550nm - land percentage - land percentage - land 0.25% 0% 0% -20% 0% -2% -0.25%-0.1% -40% -3% -0.5% -0.2% -60% -0.3% -0.75% 2002 2003 2003 2002 2003 2001 2003 2004 2002 2004 2001 2002 2004 2001 2004 2001 Year Year Year Year

CFSM1

CESM2

F3SM

**GEOS** 

**GFDI** 

**GISS** 

MIROC

NorESM2

OsloCTM3

**UKESM**