so2-at-height: 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 2e-05% -20% -30% 3% 1e-05% 20% Percent Percent Percent Percent 2% 10% 0% -60% 0% -70% 0% 2003 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2001 2002 2001 2002 2003 Year Year Year Year Year net radiative flux at TOA – land upwelling longwave flux at TOA – land upwelling shortwave flux at TOA – land upwelling clear-sky longwav flux at TOA - land incident shortwave flux at TOA - land 0% 0.05% 0.4% 1e-08% 0.3% 0.025% 0.3% -0.02% Percent Percent Percent 0.29 0.2% -0.04% 0.1% -0.025% -1e-08% -0.06° 0% 2001 2002 2003 2001 2002 2003 2001 2003 2001 2002 2003 2002 2003 Year Year Year Year Year upwelling clear-sky shortwave flux at TOA – land clear-sky net radiative dry deposition rate wet deposition rate total deposition rate flux at TOA - land of BC - land of BC - land of BC - land 0.25% 0.5% 0.9% 0.75% Percent Percent Percent Percent 0.25% 0.6% 0.5% -0.25% 0% 0.3% -0.1% 0.25% -0.5% -0.25%-0.2% 0% 0% -0.75% 2003 2003 2003 2001 2001 2001 2003 2001 2001 2003 Year Year Year Year Year dry deposition rate wet deposition rate dry deposition rate wet deposition rate total deposition rate of SO2 - land of SO2 - land of SO4 - land of SO4 – land of S - land 20% 40% -30% 30% 10% 20% Percent Percent Percent Percent Percent 20% -40% 20% 0% 10% 10% 10% -50% -10%2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 Year Year Year Year Year convective cloud cover ambient aerosol optical total cloud cover thickness at 550nm - land percentage - land percentage - land 0.1% 1.5e+36% 0% 1e+36% -0.1% 5e+35% -50% -0.2% 0% -0.3% 2002 2002 2002 2003 2001 2003 2004 2003 2004 2001 2001 Year Year CFSM1 MIROC OsloCTM3 **GFOS**

E3SM

GISS

NorESM2

UKESM