so2-at-height: percent difference surface flux of BC – arctic surface flux of SO2 – arctic surface concentration of BC – arctic surface concentration of SO4 – arctic surface concentration of SO2 – arctic 1e-04% 0% 20% 5e-05% 0% -5% 15% Percent Percent 0% Percent Per 10% -10% 5% -60% -0.00015% 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 Year Year Year Year Year upwelling longwave flux at TOA – arctic upwelling shortwave flux at TOA – arctic net radiative flux upwelling clear-sky longwav flux at TOA - arctic incident shortwave flux at TOA - arctic at TOA - arctic 0.6% 0.6% 2e-08% 0% 0% 0.4% 0.4% Percent Percent Percent 0% Percent -0.02% 0.2% 0.2% -2e-08% -0.04% -0.04% 0% -0.06% -4e-08% 2001 2003 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2002 2003 Year Year Year Year Year upwelling clear-sky shortwave clear-sky net radiative dry deposition rate wet deposition rate total deposition rate flux at TOA - arctic flux at TOA - arctic of BC - arctic of BC - arctic of BC - arctic 0.6% 0.5% 0.6% 0.4% 0.5% 0.2% Percent Percent 0.4% Percent -0.5% 0% 0.2% -0.2% -1.5% -1.5% 0% -0.4% 2003 2003 2003 2003 2001 2001 2001 2001 2003 2001 Year Year Year Year Year total deposition rate of S – arctic dry deposition rate wet deposition rate dry deposition rate wet deposition rate of SO2 - arctic of SO2 - arctic of SO4 - arctic of SO4 - arctic 80% 25% 30% 30% 60% 20% 20% Percent Percent Percent Percent 15% 40% 20% -20% 10% 15% 10% -30% 20% -40% 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 Year Year ambient aerosol optical convective cloud cover total cloud cover thickness at 550nm - arctic percentage - arctic percentage - arctic 20% 2e+36% 0.4% 0% 1.5e+36% Percent Percent 1e+36% -20% 0% 5e+35% -40% -0.2% 0% 2002 2003 2002 2003 2002 2003 2001 2004 2001 2004 2001 Year Year Year

OsloCTM3

UKESM

CFSM1

E3SM

GFOS

GISS

MIROC

NorESM2