bc-no-season: percent difference surface flux of BC – arctic surface flux of SO2 – arctic surface concentration surface concentration of SO4 – arctic surface concentration of SO2 – arctic 0.2% 0.5% 0.5% 0.03% 10% 0% 0% Percent Percent Percent Percent Percent 0% -0.2% -0.03% -0.5% -0.06% 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2001 2002 2003 Year Year Year Year Year upwelling longwave flux at TOA – arctic upwelling shortwave flux at TOA – arctic incident shortwave flux at TOA – arctic upwelling clear-sky longwav flux at TOA - arctic net radiative flux at TOA - arctic 8e-08% 0.04% 0.2% 0.2% 0.02% 6e-08% 0.02% 0.1% 0.1% Percent Percent Percent 0% 0% 4e-08% 0% -0.1% _0.1% 2e-08% -0.02% -0.02% -0.2% -0.2% 0% 2001 2002 2003 2001 2002 2003 2001 2003 2001 2002 2003 2004 2001 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 10% 0.1% 0% 5% -0.1% -0.1%Percent Percent 0% -5% -0.2%-0.2% 0% -5% -10% -0.4% -5% _15% 2001 2003 2004 2001 2003 2001 2002 2003 2001 2003 2001 2003 Year Year Year Year Year wet deposition rate of SO2 – arctic wet deposition rate of SO4 – arctic total deposition rate of S – arctic dry deposition rate dry deposition rate of SO2 - arctic of SO4 - arctic 0.6% 1.2% 0.5% 1.5% 0.5% 0.8% 0.4% 0.25% 0% Percent Percent Percent 0.4% Percent Percent 0.2% 0.5% 0% 0% -0.5% 0% 0% -0.4% -0.25%-0.5% 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 Year ambient aerosol optical convective cloud cover total cloud cover percentage - arctic percentage - arctic 0.4% 300% 0.2% 0.2% Percent Percent Percent 200% 0% 0% 100% -0.2% -0.2% 0% 2002 2002 2003 2002 2003 2001 2003 2004 2001 2004 2004 2001 Year Year Year OsloCTM3 CESM1 **GFDI** MIROC

E3SM

GISS

NorESM2