## 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% 0.03% 20% 4% 0.5% ∆ emibc ∆ emiso2 ∆ mmrso4 0.02% ∆ mmrbc 10% 2% 0% 0.01% 0% -75% -0.5% 0% 0% -100% 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2003 2004 2001 2002 2003 Year Yea Year Year Year incident shortwave flux at TOA – arctic clear–sky longwave flux at TOA – arctic longwave flux at TOA shortwave flux at TOA net radiative flux at TOA - arctic arctic arctic 8e-08% 0.075% 0% 0% 0.08% 6e-08% ∆ (rlut + rsut) 0.05% ∆ rlut -0.4% -0.4% 0.04% 4e-08% 0.025% -0.8% 0% 2e-08% 0% 0% -0.04% 2003 2001 2003 2001 2003 2001 2002 2003 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 - arctic flux at TOA - arctic at TOA - arctic of BC - arctic of BC - arctic (rlut + rsut - rlutcs - rsutcs) 15% 0% ∆ (rlutcs + rsutcs) 10% ∆ rsutcs -0.5% -0.5% ∆ drybc 5% 0% -1.5% -20% 2001 2003 2004 2001 2003 2001 2003 2002 2003 2001 2003 2001 Year Year Year Year Year wet deposition rate of SO4 – arctic total deposition rate dry deposition rate wet deposition rate dry deposition rate of BC - arctic of SO2 - arctic of SO2 - arctic of SO4 - arctic 0.6% 10% ∆ (drybc + wetbc) 0.3% ∆ dryso2 ∆ wetso2 ∆ wetso4 0% 0% 0% -5% -0.3% -10% 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 Year Year ambient aerosol optical convective cloud cover $\Delta (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3$ total cloud cover total deposition rate of S - arctic percentage - arctic percentage - arctic 0.3% ∆ od550aer -20% △ cltc ∆ct 0% \_40% -0.25% -0.3%-60% 2003 2002 2001 2002 2003 2004 2002 2003 2004 2001 2002 2004 2003 2004 2001 2001 Year Year Year Year CFSM1 F3SM **GFDI** MIROC OsloCTM3

CESM2

GEOS

**GISS** 

NorESM2

**UKESM**