bc-no-season: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - arctic of SO2 - arctic of BC - arctic of SO4 - arctic of SO2 - arctic 0.0e + 0020+01 60100 -2.5e+01 3e-02 5.0e-0 4e+00 1e+01 -5.0e+01 2e-02 0.0e+00 00+00 1e-02 -5.0e-01 -1e+0 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 Year Year upwelling longwave flux at TOA – arctic upwelling shortwave flux at TOA – arctic upwelling clear-sky longwav flux at TOA - arctic net radiative flux incident shortwave flux at TOA – arctic at TOA - arctic 5e-01 7.5e-02 8e-02 ∆ rlut + rsut 5.0e-02 0e+00 0e+00 0e+00 _5e_01 -5e-01 0e+00 0.0e+00 -1e+00 -1e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year upwelling clear-sky shortwa flux at TOA - arctic clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - arctic at TOA - arctic of BC - arctic of BC - arctic rsutcs) 4e-01 rlutcs -1e+01 -5 0e+00 -5.0e-0° -1.0e+01rsut – -1.0e+00 -1.0e+000e+00 0e+00 -1.5e+01 -1.5e+00-2.0e+01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year wet deposition rate of SO4 – arctic dry deposition rate dry deposition rate total deposition rate wet deposition rate of SO2 - arctic of SO2 - arctic of SO4 - arctic of BC - arctic 6e-01 4e+00 ∆ drybc + wetbc 3e-01 4e+00 5e+00 wetso2 ∆ wetso4 ∆ dryso4 0e+00 -2e+00 0e+00 0e+00 -50+00 -1e+01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - arctic convective cloud cover - arct surface cloud cover - arctic of S - arctic thickness at 550nm - arctic 2e+00 0e+00 3e-01 8e+00 0e+00 ∆ od550ae ا کا کا -2e+01 4e+00 0e+00 -2.5e-01 -3e-01 0e+00 -4e+00 20002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year ice water path - arctic surface concentration column mass burden column mass burden column mass burden of DMS - arctic of SO2 - arctic of BC - arctic of SO4 - arctic 2.0e+01 3e-01 1e+00 2e+0 0e+00 Δ dms 1 0e+01 1e+01 0e+00 5.0e+00 -1e+01 -3e-01 0.0e+00 0e+00 -1e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year CAM5 E3SM **GISS** OsloCTM3 CESM1 **GEOS** MIROC **UKESM**

CESM2

GFDL

NorESM2