bc-no-season: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - global of SO2 - global of BC - global of SO4 - global of SO2 - global 4e-01 6e+00 0.00+00 1e-01 3e-01 -2.5e+01 -1e+00 mmrs04 2e-01 -5.0e+01 0e+00 2e+00 10-01 -1e-010e+00 -3e+002002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2000 2001 2000 2001 2002 2003 2004 Year Year upwelling clear-sky longwav flux at TOA - global upwelling longwave flux at TOA – global upwelling shortwave flux at TOA – global net radiative flux incident shortwave flux at TOA – global at TOA - global 5.0e-08 2e-02 2.5e-02 2.5e-0° 2e-01 ∆ rsut 16-02 ∆ rlut + 00+00 0.0e+0.00e+00 -2e-01 -1e-02 -2.5e-01 -5.0e-08 -2.5e-02 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2002 2003 2004 Year Year Year Year Year clear-sky net radiative flux at TOA – global upwelling clear-sky shortway implied cloud response dry deposition rate wet deposition rate flux at TOA - global at TOA - global of BC – global of BC - global rsutcs) 4e-01 0e+00 2e-01 1e+00 2.5e-0° rsutcs rlutcs -0e+00 1e-01 0.0e+00 -1e+00 -2e+00-2e-01 rsut -2e+000e+00 -4e-01 -3e+00 -3e+00 -5 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 dry deposition rate of SO4 – global wet deposition rate of SO4 – global dry deposition rate total deposition rate wet deposition rate of BC - global of SO2 – global of SO2 - global 1e-01 ∆ drybc + wetbc -2e+00 ∆ dryso4 0.0e + 002e+00 0e+00 -4e+00 1e+00 2e+00 -02 -5.0e-01 0e+00 -1e-01 -6e+00 0e+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 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ Year total deposition rate ambient aerosol optical total cloud cover - global convective cloud cover - glob surface cloud cover - globa of S - global thickness at 550nm - globa 1e-01 0e+00 od550ae 0e+00 -1e+00∆ clt <u>\</u> 5.0e+00 -2e+00 -1e-01 -1e-01-6e+01 -3e+00 -2e-01 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 - global column mass burden column mass burden surface concentration column mass burden of DMS - global of BC - global of SO2 - global of SO4 - global 1.5e+01 4e-01 3e-01 0e+00 2e-01 2e-01 ∆ clivi 1e-01 0e+00 5.0e+00 -2e-01 -1e-01 0e+00 0.0e+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