high-so4: 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 00+00 2e-04 -4e+00 2.0e+00 -1e+00 4e+01 1.5e + 0.0mmrs₀ ∆ emibc _2e+00 0e+00 3e+0 1.0e+00 -6e+00 2e+0 5.0e-01 -2e-04 -4e+00 -7e+00 -5e+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 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 4e-02 1 00+00 2e-07 7.5e-01 4e-02 1e-07 ∆ rlut 5.0e-01 5.0e ∆ rlut + 2 5e=01 2.56 0e+00 0e+00 0.0e+00 0.0e+00 _1e_07 -8e-02 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 Year Year Year Year clear-sky net radiative flux at TOA - arctic upwelling clear-sky shortway implied cloud response dry deposition rate wet deposition rate flux at TOA - arctic at TOA - arctic of BC - arctic of BC - arctic rsutcs 4e+00 2e-01 1e+00 rsutce 3e+00 ∆ rsutcs 1e-01 ∆ rlutcs + 0e+00 0e+00 rsut 0e+00 0.0e+00 -1e-01 -1e-01 0e+00 (rlut -5e-01 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 2000 2001 Year wet deposition rate wet deposition rate of SO4 – arctic total deposition rate dry deposition rate dry deposition rate of BC - arctic of SO2 - arctic of SO2 - arctic of SO4 - arctic -3e+00 -3e+002.0e+0° 7.5e+00 ∆ drybc + wetbc 4e+00 -4e+00 3e+00 wetso2 5.0e+00 2e+00 1.0e+01 2 50+00 -60+00 0e+00 -7e+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 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ 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 4e+00 1.5e+00 0e+00 1e+01 1.0e+00 ∆ od550ae ㅎ ا کا کا -2e+01 2e-01 5e+00 5.0e-01 0e+00 0e+00 0e+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 - arctic column mass burden column mass burden column mass burden surface concentration of DMS - arctic of BC - arctic of SO2 - arctic of SO4 - arctic 8e-01 4e+00 4e-01 1.0e+012e+01 ∆ clivi Δ dms 2e+00 5 0e+00 0e+00 1e+0 0.0e+00 0e+00 -4e-01 -5.0e+00 -2e+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

CESM2

GEOS

GFDL

MIROC

NorESM2

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