arctic: percent difference surface flux surface flux surface concentration surface concentration of BC - so2-at-height of SO2 - so2-at-height of BC - so2-at-height of SO4 - so2-at-height of SO2 - so2-at-height 1e+00 0.0e+00 5.0e-04 -5.0e+00∆ mmrbc 2.5e-04 0e+00 -2e+00 -6e+01 -1.5e+012000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year upwelling longwave flux at TOA – so2–at–height upwelling clear-sky longwav flux at TOA - so2-at-heigh net radiative flux upwelling shortwave flux incident shortwave flux at TOA – so2–at–height at TOA - so2-at-height at TOA - so2-at-height 2e-02 6e-01 0e+00 0e+00 ∆ rlutcs 4e - 010e+00 2e-01 -2e-07 -4e-02 -4e-02 0e+00 2002 2003 2004 2002 2003 2004 2002 2003 2002 2003 2004 2002 2003 2004 2000 Year Year Year Year Year upwelling clear–sky shortwave flux at TOA – so2–at–height clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - so2-at-heigh at TOA - so2-at-height of BC - so2-at-height of BC - so2-at-height rsutcs) 8e-01 1e+006e-01 rlutcs -2.5e-0 △ wetbc 4e-01 ∆ rlutcs + 0.0e+00 0e+00 rsut – 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 2002 2003 2004 2000 2001 Year dry deposition rate of SO2 – so2–at–height wet deposition rate of SO2 – so2–at–height dry deposition rate of SO4 – so2–at–height wet deposition rate of SO4 – so2–at–height total deposition rate of BC - so2-at-height 3.5e+01 1e+01 3e+01 1e+00 3.0e+01 6e+01 2.5e+01 ∆ wetso2 -1e+01 ∆ dryso4 0e+00 4e+01 2.0e+01 -2e+011 50+01 -1e+00 20+01 1e+012002 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 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - so2-at-hei convective cloud cover - so2-atsurface cloud cover - so2-at-l of S - so2-at-height thickness at 550nm - so2-at-h 4e-01 0e+00 6e+01 ∆ od550ae ∆ clt -5 0e-01 0e+00 4e+01 5.0e+35 -7.5e-01 -4e+01 _2e_01 2e+01 0.0e+00-1.0e+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 - so2-at-hei surface concentration column mass burden column mass burden column mass burden of DMS - so2-at-height - so2-at-height of SO2 - so2-at-height - so2-at-height 2e+00 2e+00 5.0e-01 6e+01 1e+00 ∆ loadso2 2.5e-01 2e+01 ∆ loadso4 1e+00 4e+01 0.0e+00 -1e+001e+01 -2e+00 -2.5e-01 0e+00 -3e+00 -5.0e-01 -1e+002000 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

CAM5

CESM1

CESM2

E3SM

GEOS

GFDL

GISS

MIROC

NorESM2

OsloCTM3

UKESM