## so2-no-season: percent difference surface flux surface flux surface concentration surface concentration of BC – NH–pacific of BC - NH-pacific of SO2 - NH-pacific of SO4 - NH-pacific of SO2 - NH-pacific 0.00+00 1e+00 -1e+00 mmrs04 \_5 0e\_03 ∆ mmrbc ∆ emibc 0e+00 5e-01 0e+00 -2e+00 \_1 0e\_02 0e+00 -2e-0 -1e+00 -3e+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 shortwave flux at TOA – NH–pacific upwelling longwave flux at TOA – NH-pacific net radiative flux at TOA – NH–pacific incident shortwave flux at TOA – NH-pacific upwelling clear-sky longwa flux at TOA - NH-pacific 3e-02 1e-07 rsut 2.5e-02 5e-08 0e+00 ∆ rlut + r 2e-01 2e-01 0e+00 0.0e+00 -3e-02 0e+00 -5e-08 -6e-02 -1e-07 2000 2001 2002 2003 2004 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2000 2001 Year Year Year Year Year upwelling clear–sky shortway flux at TOA – NH–pacific clear-sky net radiative flux at TOA - NH-pacific implied cloud response dry deposition rate wet deposition rate at TOA - NH-pacific of BC - NH-pacific of BC - NH-pacific rsutcs) 1.5e-01 1.5e-01 4e-01 3e - 01rlutcs rsut △ wetbc 2e-01 ∆ rlutcs rsut – 5.0e-02 5.0e-02 -5e-01 0e+00 -3e-01 0.0e+00 0.0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 Year Year dry deposition rate of SO4 – NH–pacific wet deposition rate of SO4 – NH–pacific total deposition rate of BC – NH–pacific dry deposition rate of SO2 – NH–pacific wet deposition rate of SO2 – NH-pacific 5e-01 0e+00 ∆ wetso4 ∆ dryso4 0e+00 0e+00 -2e+00 -1e+00 -5e-0 -3e+00-8e-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 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 - NH-pacif convective cloud cover - NH-pa surface cloud cover - NH-pag of S - NH-pacific thickness at 550nm - NH-page 5e-01 0e+00 1e-01 1e-01 od550ae ا کا کا 0e+00 0e+00 0e+00 -1e-01 -4e+00-1e-01 -6e+01 -2e-01 -6e+00 20002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year ice water path - NH-pacific surface concentration column mass burden column mass burden column mass burden of BC - NH-pacific of DMS - NH-pacific of SO2 - NH-pacific of SO4 - NH-pacific 2e+00 1.2e+01 4e+00 2e-01 1e+00 ∆ clivi ∆ loadbc 0e+000e+00 4.0e+00 0e+00 -2e-01-4e-01 -2e+00 0.0e+00 -1e+00 -4e-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 Year Year Year Year

CAM5

CESM1

CESM2

E3SM

**GEOS** 

GFDL

**GISS** 

MIROC

NorESM2

OsloCTM3

**UKESM**