SH-sea: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - no-so4 of SO2 - no-so4 of BC - no-so4 of SO4 - no-so4 of SO2 - no-so4 2e-05 0.0e+0.02e+00 1e+00 1e-05 00+00 1e+00 0e+00 5e-01 -5e-01 -1e-05 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 upwelling longwave flux at TOA – no-so4 upwelling shortwave flux at TOA – no–so4 upwelling clear–sky longwave flux at TOA – no–so4 net radiative flux incident shortwave flux at TOA - no-so4 at TOA - no-so4 3e-01 1.2e-01 2e-01 2e-08 8 0e=02 2e-01 rsut 2e-02 0e+00 ∆ rlutcs ∆ rlut + r 4.0e-02 1e-01 1e-02 -2e-08 0e+00 0.0e+00 -4e-08 00+00 -6e-08 -4.0e-02 -1e-0 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year clear-sky net radiative flux at TOA - no-so4 dry deposition rate of BC – no–so4 wet deposition rate of BC – no-so4 upwelling clear-sky shortway implied cloud response flux at TOA - no-so4 at TOA - no-so4 rsutcs) 5e-01 3e-01 rlutcs -4e-02 0e+00 2e-01 ∆ rsutcs 3e-02 ∆ rlutcs + 1e-01 0e+00 rsut – 0e+00 0e+00 -4e-02 -1e+00-3e-02 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 Year Year dry deposition rate of SO2 – no–so4 total deposition rate of BC – no–so4 wet deposition rate dry deposition rate wet deposition rate of SO4 – no-so4 of SO2 - no-so4 of SO4 - no-so4 1e+00 2e+00 5.0e-01 5e-01 2.5e-01 0.0e+00 1e+00 0e+00 dryso2 ∆ wetso2 0.0e+00 -5e-01 -2.5e-0-1e+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 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - no-so4 convective cloud cover - no-s surface cloud cover - no-se of S - no-so4 thickness at 550nm - no-so 0.0e+00 -2e+0 ∆ od550ae -5.0e-01 0e+00 <u>0</u> _4e+01 -1.0e+00 -1e-01 -6e+01 -1e+00 -2e-01 -3e-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 - no-so4 surface concentration column mass burden column mass burden column mass burden of BC - no-so4 of DMS - no-so4 of SO2 - no-so4 of SO4 - no-so4 5e-01 1.5e+01 5.0e-01 3e+00 0e+00 0.0e + 0.00.0e+00 1.0e+01 ∆ clivi ∆ loadso2 2e+00 ∆ dms -5.0e-01 -5e-01 5.0e+00 -2.5e-01 -1.0e+00 0e+00 -1e+00 0.0e + 0.0-1.5e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2000 2001 2002 2003 2004

Year

GISS

MIROC

NorESM2

Year

OsloCTM3

UKESM

Year

Year

Year

CAM5

CESM1

CESM2

E3SM

GEOS

GFDL