NH-pacific: absolute difference surface flux of SO2 – no-so4 surface concentration of BC – no–so4 surface flux of BC – no-so4 surface concentration of SO4 – no–so4 surface concentration of SO2 – no–so4 2.4e+00 8e-01 -05 -1.0e+00 2e+00 2.0e+00 4e-01 -1.5e+00 ∆ mmrbc ∆ emibc 1e-05 -2 0e+00 0e+00 1.6e+00 -2.5e+000e+00 1.2e+00 -3.0e+00 -1e-05 2003 2003 2002 2003 2002 2003 2001 2002 2004 2001 2002 2001 2002 2003 2001 2001 Year Year Year Year Year upwelling longwave flux at TOA – no–so4 upwelling shortwave flux at TOA – no–so4 upwelling clear-sky longwav flux at TOA - no-so4 net radiative flux incident shortwave flux at TOA - no-so4 at TOA - no-so4 1e-01 1e-01 1e-01 1e-02 0.0e+00 5e-02 0e+00 ∆ rlutcs ∆ rlut ∆ rsut 0e+00 -1e-01 -1e-01 -1e-02 -5.0e-08 -5e-02 -2e-01 -2e-02 -2e-01 2003 2003 2003 2003 2001 2002 2003 2004 2001 2002 2004 2001 2002 2004 2001 2002 2001 2002 Year Year Year Year dry deposition rate of BC – no-so4 upwelling clear-sky shortwa clear-sky net radiative implied cloud response wet deposition rate flux at TOA - no-so4 flux at TOA - no-so4 at TOA - no-so4 of BC - no-so4 1.5e-01 rsutcs 2e+00 1.0e-01 4e-01 ∆ rlutcs + rsutcs 0e+00 ∆ (rlut + rsut - rlutcs ∆ rsutcs 1e+00 5.0e-02 0e+00 0.0e+00 -1e-01 0e+00 -4e-01 -5.0e-02 -1e+00 2001 2002 2003 2001 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 Year Year Year Year Year total deposition rate of BC – no–so4 dry deposition rate of SO2 – no–so4 wet deposition rate of SO2 – no–so4 dry deposition rate of SO4 – no-so4 wet deposition rate of SO4 – no–so4 2.5e+00 -1e+00 2.0e+00 1.8e + 0.02e+00 drybc + wetbc -5.0e-01 ∆ dryso² 1e+00 -2e+00 1.0e+00 1.5e+00 5.0e-01 0e+00 1.2e+00 -1.0e+00 -3e+00 0.0e+00-1e+00 -1.2e+00 2003 2002 2003 2001 2002 2003 2002 2003 2002 2003 Year Year total deposition rate of S – no–so4 ambient aerosol optical total cloud cover convective cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3thickness at 550nm - no-so percentage - no-so4 percentage - no-so4 0e+00 1.2e+00 2e-01 1e-01 2e-01 -2e+01 8.0e-01 0e+00 0e+00 -4e+01 4.0e-01 -1e-01 -6e+01-2e-01 0.0e+00 -2e-01 -3e-012001 2002 2003 2004 2002 2003 2002 2003 2002 2003 Year Year Year Year

CESM1

E3SM

GISS

CESM2

MIROC

NorESM2

GFDL

OsloCTM3

UKESM

GEOS