## NH-pacific: absolute difference surface flux of SO2 – bc–no–season surface concentration of BC – bc–no–season surface flux of BC – bc–no–season surface concentration of SO4 – bc–no–season surface concentration of SO2 – bc–no–seasor 1.9e-16 0.0e+00 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ mmrso4 (kg kg – 1) emiso2 (kg $m^{-2}$ s<sup>-</sup> mmrbc (kg kg –1) so2 (kg kg-1) 2.0e-17 -1.0e-10 -6.4e-17 0.0e+0.02002 2003 2002 2003 2002 2003 2002 2003 2002 2003 2001 2001 2001 2001 2004 2001 Year Year Year Year Year upwelling longwave flux at TOA – bc-no-season upwelling shortwave flux at TOA – bc–no–season upwelling clear-sky longway flux at TOA - bc-no-seaso net radiative flux incident shortwave flux at TOA - bc-no-season at TOA - bc-no-season 3e-01 1e-01 rlut + rsut $(W m^{-2})$ 2e-01 m-2rsut (W m-2) rsdt (W m-2) rlut (Wm-2)0e+00 1e-07 5e-02 rlutcs (W 1e-01 0e+00 0e+00 0e+00 \_1e\_0 -1e-07 -5e-02 -1e-01 2003 2003 2001 2002 2003 2001 2002 2003 2001 2002 2003 2001 2002 2001 2002 Year Year Year Year Year dry deposition rate of BC – bc–no–season upwelling clear-sky shortwa clear-sky net radiative implied cloud response wet deposition rate flux at TOA - bc-no-seas flux at TOA - bc-no-seaso at TOA - bc-no-season of BC - bc-no-season rlut + rsut - rlutcs - rsutcs (W 4e-02 1e-01 rlutcs + rsutcs (W $m^{-2}$ ) 0.0e+00 rsutcs (Wm-2)drybc (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ wetbc (kg $\mathrm{m}^{-2}~\mathrm{s}^{-1}$ 0e+00 0e+00 1e-01 -5.0e-02-8e-02 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 2001 2002 2003 2004 2001 2002 2003 Year Year Year Year Year dry deposition rate of SO4 – bc–no–season total deposition rate dry deposition rate wet deposition rate wet deposition rate of BC - bc-no-season of SO2 - bc-no-season of SO2 - bc-no-season of SO4 - bc-no-seasor 1.0e-14 1.1e-14 $drybc + wetbc (kg m^{-2} s^{-1})$ 5.2e-15 $dryso2 (kg m^{-2} s^{-1})$ wetso2 $(kg m^{-2} s^{-1})$ 6.6e-15 $dryso4 (kg m^{-2} s^{-1})$ wetso4 (kg m<sup>-2</sup> s<sup>-1</sup>) 1.0e-13 -2e-14 5.0e-14 0.0e+000e+00 -6.9e-2001 2002 2003 2001 2003 2002 2003 2001 2003 2002 2003 Year convective cloud cover percentage – bc-no-season total deposition rate ambient aerosol optical total cloud cover (dryso2 + wetso2)/2 + (dryso4 + wetso4)/3of S – bc–no–seasor thickness at 550nm - bc-no-se percentage - bc-no-seasor 0.0e+00 0.0e+00 expression(clt~(%) 1e-01 $(kg m^{-2} s^{-1})$ 2.5e-14 -5.0e-02 0e+00 0.0e+00-7.5e-02 2001 2002 2003 2004 2002 2003 2002 2002 2003 Year Year Year Year **UKESM** CESM1 GISS MIROC **GFDI**

E3SM

CESM2

NorESM2

OsloCTM3

**GEOS**