shp-60p-red-1950: absolute difference surface flux of SO2 – NH–land surface flux of BC – NH–land surface concentration surface concentration of SO4 – NH–land surface concentration of SO2 – NH–land 6.8e-19 emibc $(kg m^{-2} s^{-1})$ nmrbc (kg kg-1) mmrso4 (kg kg –1) əmiso2 (kg m $^{-2}$ s $^{-1}$ 3 76-19 so2 (kg kg – 1) 0e+00 6.8e-20 4e-12 -2.3e-19 -8e-12 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – NH–land upwelling shortwave flux at TOA – NH–land net radiative flux at TOA – NH–land incident shortwave flux at TOA – NH–land upwelling clear-sky longwav flux at TOA - NH-land 4e+00 1e-07 3e+00 rlut + rsut $(W m^{-2})$ rlut (Wm-2)sdt (Wm-2)(Wm-2)3e+00 -2e-01 rlutcs (W m-2e+00 2e+00 .snt 1e+00 0e+00 -2e-07 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 Year Year Year Year upwelling clear-sky shortwar flux at TOA - NH-land implied cloud response at TOA – NH-land clear-sky net radiative dry deposition rate of BC – NH–land wet deposition rate of BC – NH–land rsutcs $(W m^{-2})$ flux at TOA – NH-land 5 4e-15 rlutcs + rsutcs (W m⁻²) 7.5e-01 drybc (kg $\mathrm{m}^{-2} \mathrm{s}^{-1}$ 3.9e-15 vetbc (kg m⁻² s⁻ 2e-01 rsutcs (W m-2e+00 5.0e-01 2.4e-15 -8.1e-15 rlutcs -1e-01 1e+00 2.5e-01 8.9e-16 rsut-0e+000.0e+00 rlut + 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 total deposition rate of BC – NH–land dry deposition rate of SO2 – NH-land wet deposition rate of SO2 - NH-land dry deposition rate of SO4 – NH-land wet deposition rate of SO4 - NH-land 2 6e-15 -1 4e-14 86-12 1.5e-12 drybc + wetbc (kg m⁻² s⁻¹) wetso2 (kg m⁻² s⁻¹. dryso4 (kg m⁻² s⁻¹) wetso4 (kg m⁻² s⁻¹ dryso2 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ -1e-04 1.0e-12 -6.0e-15 -2e-04 5.0e-13 -1.0e-14 -3 0e-14 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 dyso2 + wetso2)/2 + (dyso4 + wetso4)/3total deposition rate of S – NH–land cloud cover Ice water path - NH-land Dimethyl sulphide (DMS) mole fraction ambient aerosol optical thickness at 550nm – NH-la percentage - NH-land 0.0e+00 1e-14 2.0e-02 expression cltc (% m^{-2} -1e-04 _lom lom) smp -5 0e-05 $(kg m^{-2} s^{-1})$ 0e+00 (kg 0e+001.0e-02 -3e-04 0.0e+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 load load load of so2 - NH-land of so4 - NH-land of bc - NH-land -2e-08 1e-08 loadso4 (kg m⁻²) loadso2 (kg m⁻²) oadbc $({\sf kg}\ {\sf m}^{-2})$ -4e-08 0e+00 -6e-08 -8e-08 -1e-09 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year

CAM-ATRAS

CESM1

F3SM

GEOS

GISS modelE

NorESM2