## shp-60p-red: absolute difference surface flux of BC – arctic surface flux of SO2 – arctic surface concentration surface concentration of SO4 – arctic surface concentration of SO2 – arctic 2 26-19 0.0e + 0.00 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ mmrbc (kg kg – 1) əmiso2 (kg m<sup>-2</sup> s<sup>-</sup> 9 16-20 so2 (kg kg-1) (kg kg-0e+00 -4.1e-20 -1.0e-12 2000 2001 2002 2003 2004 2000.02002.52005.02007.5 2000.02002.52005.02007.5 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – arctic upwelling shortwave flux at TOA – arctic incident shortwave flux at TOA – arctic upwelling clear-sky longwav flux at TOA - arctic net radiative flux at TOA – arctic 5e-02 rsut (W m<sup>-</sup> 0e+00 rlut (Wm-2)rlutcs (W mrsut (W m-E ٤ -4e-02 -2e-01 rsdt ( ± ≒ \_3e\_01 -5e-02 -8e-02 -3e-01 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 Year Year Year Year Year upwelling clear-sky shortway flux at TOA - arctic clear-sky net radiative flux at TOA – arctic implied cloud response at TOA – arctic dry deposition rate of BC – arctic wet deposition rate of BC – arctic rlutcs - rsutcs (W m<sup>-2</sup>) 3.4e - 155.0e-02 rsutcs (W m<sup>-2</sup> rsutcs (W m-2) drybc (kg m<sup>-2</sup> s<sup>-1</sup> 2.5e-15 vetbc (kg m<sup>-2</sup> s<sup>-</sup> 0.0e+00 -1e-01 1.5e-15 -2e-01 6.4e-16 rsut 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 – arctic dry deposition rate of SO2 – arctic wet deposition rate of SO2 – arctic dry deposition rate of SO4 – arctic wet deposition rate of SO4 – arctic 3 1e-15 $drybc + wetbc (kg \ m^{-2} \ s^{-1})$ -5e-14 0.0e + 007.5e-03 vetso2 (kg m $^{-2}$ s $^{-1}$ dryso2 (kg m $^{-2}$ s $^{-1}$ dryso4 (kg $\mathrm{m}^{-2} \mathrm{s}^{-1}$ 2.2e-15 wetso4 (kg m<sup>-2</sup> 5.0e-03 1.3e-15 2.5e-03 3.5e-16 0.0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year 4ryso2 + wetso2)/2 + (dryso4 + wetso4)/3total deposition rate of S – arctic cloud cover Ice water path - arctic Dimethyl sulphide (DMS) mole fraction ambient aerosol optical percentage - arctic thickness at 550nm - arctic 1e-04 clivi $(kg m^{-2})$ \_lom lom) smp $(kg m^{-2} s^{-1})$ 양 expression 0e+00 2e-01 1e-03 -5e-05 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 of so4 - arctic of bc - arctic arctic 0.0e+00 0e+00 loadso4 (kg m<sup>-2</sup>)loadbc (kg m<sup>-2</sup>) oadso2 (kg m<sup>-2</sup>) 4e-10 -2e-08 0e+00 -4e-08 -1 0e-07 4e-10 -6e-08 2000 2001 2002 2003 2004 2002 2003 2004 Year Year Year

CAM-ATRAS

CESM1

F3SM

**GEOS** 

GFDI -FSM4

GISS modelE

NorESM2