## NH-land: absolute difference surface flux of SO2 – shp–10p–red surface flux of BC – shp–10p–red surface concentration surface concentration surface concentration of BC - shp-10p-red of SO4 - shp-10p-red of SO2 - shp-10p-red 0.0e+00 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ 2.5e-13 kg-15.0e-12 1.2e-19 emiso2 (kg m<sup>-2</sup> s<sup>-</sup> so2 (kg kg – 1) -5 0e-12 mmrso4 (kg kg 0.0e+00 nmrbc (kg 1.9e-20 -2.5e-13 0.0e+00 -8.5e-20 -1.6e-14 -5.0e-13 -2 5e-12 -1 9e-19 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 upwelling longwave flux at TOA – shp–10p–red upwelling shortwave flux at TOA – shp–10p–red upwelling clear-sky longway flux at TOA - shp-10p-red net radiative flux incident shortwave flux at TOA – shp–10p–red at TOA - shp-10p-red 5 0e=02 3e-02 rsut (W m<sup>-2</sup>) 6e-02 36\_02 rlut (Wm-2)rsut (Wm-2)(Wm-2)rlutcs (W m-0e+00 3e-02 0e+00 0.0e + 0.01e-02 -5e-02 rsdt rlut + 0e+00 -3e-02 -2 5e-02 -1e-02 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 upwelling clear-sky shortwa clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - shp-10p-re flux at TOÁ - shp-10p-red $\rm rsutcs \ (W \ m^{-2})$ at TOA - shp-10p-red of BC - shp-10p-red of BC - shp-10p-red 0.0e + 0.01.2e-15 1e-02 lutcs + rsutcs (W $m^{-2}$ ) rsutcs (W m-2) drybc (kg $m^{-2} s^{-1}$ vetbc (kg m<sup>-2</sup> s<sup>-</sup> -1.0e-02 -1e-02rlutcs -0e+00 -1.5e-02 -2.0e-02 rsut -3e-02-2.5e-02 \_4 3e\_16 rit + 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 – shp–10p–red dry deposition rate of SO4 – shp–10p–red wet deposition rate of SO4 – shp–10p–red dry deposition rate of SO2 – shp–10p–red wet deposition rate of SO2 – shp–10p–red 9.5e-16 -9.0e-15 8.8e-18 $\mathrm{drybc} + \mathrm{wetbc} \, (\mathrm{kg} \, \mathrm{m}^{-2} \, \mathrm{s}^{-1})$ wetso2 (kg $m^{-2}$ s<sup>-1</sup> dryso2 (kg m $^{-2}$ s $^{-1}$ 4.6e-17 dryso4 (kg $m^{-2}$ s<sup>-</sup> wetso4 (kg m<sup>-2</sup> -5.0e-14 -8.6e-16 -1.4e-14 -5.3e-15 -1.8e-15 -9.5e--1.8e-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 dryso2 + wetso2)/2 + (dryso4 + wetso4)/3Ice water path - shp-10p-@imethyl sulphide (DMS) mole fraction total deposition rate cloud cover ambient aerosol optical of S - shp-10p-red percentage - shp-10p-red thickness at 550nm - shp-10p-red 4e - 022.0e-15 8 2e-02 clivi (kg $m^{-2}$ ) \_lom lom) smb $(kg m^{-2} s^{-1})$ expression cltc 0e+00 od550aer -2e-04 -2e-02 4e-04 -1.9e-15 -1.5e-14 -4e-02 -6e-04 20002001200220032004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year load load of so4 - shp-10p-red of bc - shp-10p-red loadso4 (kg m<sup>-2</sup>)loadbc (kg m<sup>-2</sup>) -3e-08 -4e-08 -1e-10 -5e-08 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004

Year

Year