NH-land: absolute difference surface flux surface flux surface concentration surface concentration surface concentration of BC - shp-10p-red-1950 of SO2 - shp-10p-red-19 of SO2 - shp-10p-red-195 of BC - shp-10p-red-1950 of SO4 - shp-10p-red-195 -3.8e-02 1e-01 1e-01 1.5e-05 1e-01 -4.0e-02 0e+00 0e+00 1.0e-05 $\Delta so2$ -1e-01 -4.5e-02 5.0e-06 -1e-01 -2e-01 -4.8e-02 -2e-01 -3e-01 0.0e+00 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-195 upwelling shortwave flux at TOA – shp-10p-red-195 incident shortwave flux at TOA – shp–10p–red–19! upwelling clear-sky longwav flux at TOA - shp-10p-red-1 net radiative flux at TOA - shp-10p-red-19 5.0e-02 0e+00 1e-02 0.0e+00 ∆ rlut + rsut -02 ∆ rsut 5e-03 0e+00 0.0e + 0.0e +-2.5e-02 _2e_02 -2 5e-02 -4e-02 _5 0e_02 -3e-02 -5e-03 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 shortway clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOA - shp-10p-red-19 flux at TOA - shp-10p-red-19 at TOA - shp-10p-red-195 of BC - shp-10p-red-1950 of BC - shp-10p-red-1950 rsutcs) 2e-02 rsutcs 1e-02 2e-02 0e+00 5e-02 1e-01 rlutcs -△ wetbc Δ drybα 0e+00 0e+00 0e+00 0e+00 _1e_02 -5e-02 -1e-01 (rlut + -2e-02 _2e_02 -1e-01 -1e-01 -2e-01 -3e-022000 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–1950 dry deposition rate of SO2 – shp–10p–red–19 wet deposition rate of SO2 – shp–10p–red–195 dry deposition rate of SO4 – shp–10p–red–195 wet deposition rate of SO4 – shp-10p-red-195 3e-01 -8.0e-02 0e+00 2e-01 1e-01 drybc + wetbc 1e-01 ∆ dryso4 0e+00 0e+00 -1.1e-01 -1e-01 -1e-01 -2e-01 -2e-01 -2e-01 -1.2e-01 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 $\frac{dryso2 + wetso2}{2 + (dryso4 + wetso4)/3}$ Ice water path - shp-10p-Dantethyl sulphide (DMS) mole fraction - sh total deposition rate cloud cover ambient aerosol optical of S - shp-10p-red-19 percentage - shp-10p-red-19 thickness at 550nm - shp-10p-red-1 2e-01 -5.0e-02 5e-01 5e-01 8 1e-01 clivi (kg m⁻²) _lom lom) smp expression cltc -1.0e-01 ∆ od550aeı 0e+00 0e+00 0e+00 -1.5e-01 -1e-01 -5e-0° -5e-01 -2.0e-01 -2e-01 -1e+00 20002001200220032004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 Year Year Year Year Year load load of so4 - shp-10p-red-195 of bc - shp-10p-red-1950 2e-01 1e-01 loadso4 (kg m⁻²) loadbc (kg m $^{-2}$) 1e-01 0e+00 0e+00 -1e-01 -1e-01 -2e-01

2000 2001 2002 2003 2004

2000 2001 2002 2003 2004

Year