## SH-sea: absolute difference surface flux of BC – shp–20p–red surface flux surface concentration surface concentration surface concentration of SO2 - shp-20p-red of BC - shp-20p-red of SO4 - shp-20p-red of SO2 - shp-20p-red 2e-05 -4e-01 -5.0e-01 2e-01 1e-05 -7.5e-01 0e+00 -1.0e+00 \_6e\_01 0e+00 -2e+00 -2e-01 \_1 2e+00 -7e-01 -1e-05 -8e-01 -2e-05 -1.8e + 0.0-6e-01 2000 2001 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – shp–20p–red upwelling shortwave flux at TOA – shp–20p–red upwelling clear–sky longwav flux at TOA – shp–20p–red net radiative flux incident shortwave flux at TOA – shp–20p–red at TOA - shp-20p-red 2.5e-02 5 0e-02 0.0e+00 4e-03 0.0e+00 1e-02 rlut + rsut 2e-03 -2 5e-02 0.0e + 000e+00 -5 0e-02 -1e-02 -2 5e-02 \_2e\_03 -7.5e-02 -7 5e-02 -2e-02 -4e-03 -5.0e-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-20p-re flux at TOÁ - shp-20p-re at TOA - shp-20p-red of BC - shp-20p-red of BC - shp-20p-red -1.2e-02 2e-02 2e-01 -1.5e-02 1e-01 S 00+00 △ wetbc -1.8e-02 ∆ drybc -2e-02 -2.0e-02 -1.7e-02 rsut -1e-01 -2 3e-02 큳 -4e-01 -2.5e-02 -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 Year Year Year Year total deposition rate of BC – shp–20p–red dry deposition rate of SO2 – shp-20p-red wet deposition rate of SO2 – shp–20p–red dry deposition rate of SO4 – shp–20p–red wet deposition rate of SO4 – shp–20p–red 3e-01 -5e-01 drybc + wetbc wetso4 -2e-01 -6e-01 \_7 2e\_01 -6e-01 \_3e\_0 -7e-01 -7e-01 -3e-01 -6e-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 dryso2 + wetso2)/2 + (dryso4 + wetso4)/3Ice water path - shp-20p-Drimethyl sulphide (DMS) mole fraction total deposition rate cloud cover ambient aerosol optical of S - shp-20p-red percentage - shp-20p-red thickness at 550nm - shp-20p 2e-01 1e-01 0.0e+00 % -7.2e-01 clivi $(kg m^{-2})$ \_lom lom) smb expression cltc 1e-01 -5.0e-02 0e+00 -7.6e-01 5e-02 -1.0e-01 0e+00 -1.5e-01 -8.0e-01 -2e-01 -2.0e-01 0e+00 -1e-01 -8.4e-01 20002001200220032004 2002 2003 2004 2000 2001 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-20p-red of bc - shp-20p-red 4e-01 -2.5e-01 $\log \log (\log \, m^{-2})$ loadbc (kg m 2e-01 -5.0e-01 0e+00 -7.5e-01 -2e-01 -1.0e+00 -4e-01

2000 2001 2002 2003 2004

2000 2001 2002 2003 2004

Year