## NH-sea: absolute difference surface flux of SO2 – shp–80p–red surface concentration surface concentration surface concentration of BC - shp-80p-red of SO4 - shp-80p-red of SO2 - shp-80p-red -8.8e-13 -9.0e-13 mmrbc (kg kg-1) emiso2 (kg m<sup>-2</sup> s<sup>-′</sup> so2 (kg kg – 1) nmrso4 (kg kg -2.0e-1 -9 5e-13 0e+002000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year upwelling shortwave flux at TOA – shp–80p–red net radiative flux at TOA – shp–80p–red upwelling clear-sky longwav flux at TOA - shp-80p-red incident shortwave flux at TOA – shp–80p–red 5 0e=02 $rsut(W m^{-2})$ rlutes (W m-2) rsut (Wm-2)(Wm-2)4e-02 -2.0e-01 0.0e + 0.0-2.5e-01 -4e-01 rsdt -2 5e-02 -5e-01 -3.0e-0100+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year clear-sky net radiative implied cloud response dry deposition rate wet deposition rate flux at TOÁ - shp-80p-red at TOA - shp-80p-red of BC - shp-80p-red of BC - shp-80p-red rsutcs (W $m^{-2}$ ) 3.9e-16 0e+00 lutcs + rsutcs $(W m^{-2})$ vetbc (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ 1.6e-16 drybc (kg $m^{-2} s^{-1}$ 1.6e-16 rlutes -6e-02 -2e-01 4.8e-17 -9e-02 rsut -6.5e-1 rit + 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year dry deposition rate of SO4 – shp–80p–red dry deposition rate of SO2 – shp–80p–red wet deposition rate of SO2 – shp–80p–red wet deposition rate of SO4 – shp–80p–red -8.9e-1 -6.6e-13 -5.0e-13 dryso2 (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ vetso2 (kg m $^{-2}$ s $^{-1}$ dryso4 (kg m<sup>-2</sup> -8.0e-14 wetso4 $(kg m^{-2})$ \_5 5e\_13 -9.3e -7.0e-13 -6.5e-13 -9.6e-2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Ice water path - shp-80p-Dimethyl sulphide (DMS) mole fraction cloud cover ambient aerosol optical percentage - shp-80p-red thickness at 550nm - shp-80p-red 2e-02 8 1e-02 clivi $(kg m^{-2})$ \_lom lom) smp expression cltc 2e-04 0e+00 od550aer 0e+00 0e+00 -1e-02 -2e-042002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year load of bc - shp-80p-red

surface flux of BC – shp–80p–red

2000 2001 2002 2003 2004

Year

upwelling longwave flux at TOA – shp–80p–red

2000 2001 2002 2003 2004

Year

upwelling clear-sky shortway

flux at TOA - shp-80p-red

2000 2001 2002 2003 2004

Year

total deposition rate of BC – shp–80p–red

2000 2001 2002 2003 2004

Year

total deposition rate

of S - shp-80p-red

20002001200220032004

Year

oadbc (kg m<sup>-2</sup>

0e+00

2000 2001 2002 2003 2004

Year

load

of so4 - shp-80p-red

2000 2001 2002 2003 2004

Year

 $\mathrm{emibc}\,(\mathrm{kg}\,\mathrm{m}^{-2}\,\mathrm{s}^{-1})$ 

5.8e-22

-3.0e-21

-4 8e-2

2.0e-01

1.5e-0

1.0e-01

5.0e-02

0.0e+00

-6e-02

-8e-02

-1e-01

6.5e-16

1.9e-16

-2.6e-16

rlut (W m-2)

rsutcs (W m-2)

 $\mathrm{drybc} + \mathrm{wetbc} \, (\mathrm{kg} \, \mathrm{m}^{-2} \, \mathrm{s}^{-1})$ 

dryso2 + wetso2)/2 + (dryso4 + wetso4)/3

 $(kg m^{-2} s^{-1})$ 

-1.0e-07

-1.2e-07

-1.8e-07

 $loadso4 (kg m^{-2})$ 

-5.3e-

-5.4e-13

-5.5e-13