shp-ind-shift-1950: absolute difference surface flux of BC – sea surface concentration of SO4 – sea surface flux surface concentration surface concentration of SO2 – sea _2 5e_15 mmrso4 (kg kg-1) nmrbc (kg kg-1) $^{-2}$ s $^{-2}$ s $^{-}$ so2 (kg kg – 1) 0e+00 0e+00 -8.9e-15 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year Year Year Year upwelling longwave flux at TOA – sea upwelling shortwave flux at TOA – sea incident shortwave flux at TOA – sea upwelling clear-sky longway flux at TOA - sea net radiative flux at TOA – sea 1e-07 $rsut (W m^{-2})$ 3e-02 rlutcs (Wm-2)rsdt (Wm-2)rsut (W m-2) 00+00 0e+00 0e+00 0e+00 -2e-02 -6e-02 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 2002 2003 2004 Year Year Year Year Year upwelling clear-sky shortway flux at TOA - sea clear–sky net radiative flux at TOA – sea implied cloud response at TOA – sea dry deposition rate of BC – sea wet deposition rate of BC – sea rlutcs - rsutcs (W m⁻²) 4e-02 m⁻² 1e-02 2e-02 vetbc (kg $\mathrm{m}^{-2}\,\mathrm{s}^{-1}$ drybc (kg m^{-2} s $^$ rlutcs + rsutcs (W 5e-03 0e+00 -9.0e -2e-02 rsut – rlut + 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year total deposition rate of BC – sea dry deposition rate of SO2 – sea wet deposition rate of SO2 – sea dry deposition rate of SO4 – sea wet deposition rate of SO4 – sea -2 4e-15 6 6e-16 5.3e-15 $\rm wetso2~(kg~m^{-2}~s^{-1}$ wetso4 $(kg m^{-2} s^{-1}$ $dryso4 (kg m^{-2} s^{-1}$ dryso2 (kg m $^{-2}$ s $^{-1}$ 2e-05 -3 0e-15 0e+002000 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 cloud cover total deposition rate of S – sea Ice water path - sea Dimethyl sulphide (DMS) mole fract ambient aerosol optical thickness at 550nm – sea percentage - sea 8 _lom lom) smp clivi (kg m⁻²) 양 1e-02 od550aeı expression 1e-04 0e+00 0e+00 20002001200220032004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year load load load of so2 of so4 - sea of bc - sea sea loadso2 (kg m⁻²) oadbc (kg m⁻²) 0e+000.0e+00 -1e-09

4.8e-21

2 4e-21

5.3e-23

-2.3e-21

6e-02

4e-02

2e-02

0e+00

-2e-02

4e-03

0e+00

-4e-03

_8e_03

3.6e-16

1.2e-16 -1.2e-16

-3.7e-16

rlut (Wm-2)

rsutcs (W m-2)

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

dyso2 + wetso2)/2 + (dryso4 + wetso4)/3

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

7.5e-09

5.0e-09

2.5e-09

0.0e+00

2000 2001 2002 2003 2004

Year

loadso4 (kg m⁻²)

1.0e-05

0.0e + 00

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

