arctic: absolute difference surface flux of BC – shp–ind–shift surface flux surface concentration surface concentration surface concentration of SO2 - shp-ind-shift of BC - shp-ind-shift of SO4 - shp-ind-shift of SO2 - shp-ind-shift 5.0e-01 2.0e-02 4e-01 5.0e-05 0.0e+00 2e-01 ∆ emibc so2 2.5e-05 -5 0e-01 1.0e-02 -5 0e-01 5 0e-03 -1.0e+00 0.0e + 0.0e +-7.5e-01 -2e-01 0.0e+00 -1.5e+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 Year Year Year Year Year upwelling longwave flux at TOA – shp–ind–shift upwelling shortwave flux at TOA – shp-ind-shift upwelling clear–sky longwav flux at TOA – shp–ind–shif incident shortwave flux at TOA – shp-ind-shift net radiative flux at TOA - shp-ind-shift 2e-01 5 0e-02 2e-01 3e-02 1e-01 2e-02 1e-01 2e-02 rsut 0e+00 0e+00 1e-02 1e-02 0.0e + 0.0e +듣 0e+00 00+00 -2 5e-02 -2e-01 -1e-02 -1e-02 -3e-0 -2e-02 -3e-0 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 dry deposition rate wet deposition rate implied cloud response flux at TOA - shp-ind-shift flux at TOA - shp-ind-shift at TOA - shp-ind-shift of BC - shp-ind-shift of BC - shp-ind-shift rsutcs) 1e-01 1e-01 rsutcs 5e-02 1e-01 rlutcs – 0e+00 ∆ rsutcs ∆ wetbc ∆ drybc 0e+00 0e+00 rsut – 0e+00 -5e-02 -2e-01 -1e-01 (rlut + 1e-01 -1e-01 -4e-012000 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-ind-shift dry deposition rate of SO2 – shp–ind–shift wet deposition rate of SO2 – shp-ind-shift dry deposition rate of SO4 – shp–ind–shift wet deposition rate of SO4 – shp-ind-shift -3e-01 -1.5e-01 0e+00 5e-0 -4e-0 drybc + wetbc ∆ dryso2 ∆ dryso4 0e+00 -5e-01 -6e-01 -6e-01 -7e-01 -3.0e-01 -1e+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 dryso2 + wetso2)/2 + (dryso4 + wetso4)/3Ice water path - shp-ind-simethyl sulphide (DMS) mole fraction total deposition rate cloud cover ambient aerosol optical of S - shp-ind-shift percentage - shp-ind-shi thickness at 550nm - shp-ind-4e-01 5.0e-01 -6e-01 1e+00 2e-01 2.5e-01 clivi $(kg m^{-2})$ _lom lom) smb ctc ∆ od550aei 5e-01 0.0e+00 2e-01 -2.5e-01 0e+00 1e-01 -8e-01 -2e-0° -5.0e-01 -5e-00e+00 -7 5e-01 -4e-01 20002001200220032004 2000 2001 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 Year Year Year Year Year load load of so4 - shp-ind-shift of bc - shp-ind-shift 1e+00 2.5e-01 loadso4 (kg m⁻²) oadbc (kg m 5e-01 0.0e+00 0e+00 -2.5e-01 -5.0e-01 -5e-01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004

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