bc-no-season: absolute difference surface flux of BC – arctic surface concentration of SO4 – arctic surface flux surface concentration surface concentration of SO2 - arctic of BC - arctic of SO2 - arctic 6.1e-16 1.8e-15 4e_12 emiso2 $(kg m^{-2} s^{-1})$ ∆ mmrbc (kg kg − 1) ∆ so2 (kg kg − 1) (kg kg-4.3e-8.5e-16 5 0e-12 0e+00 ∆ mmrso4 -4e-10 -2 4e-16 3.8e-16 -2e-12 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 upwelling longwave flux at TOA – arctic upwelling shortwave flux at TOA – arctic upwelling clear-sky longwav flux at TOA - arctic incident shortwave flux net radiative flux at TOA - arctic at TOA - arctic 5.0e-02 Δ rlut + rsut (W m⁻²) 1e+00 Δ rlutcs (W m-2) 0.0e+00 rsdt (W m – rsut (W m-2e-07 5e-01 -5.0e-02 0e+00 -1.0e-0.100+00 -1.5e-01 -5e-01 -5e-01 -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 clear-sky net radiative flux at TOA – arctic dry deposition rate of BC – arctic upwelling clear-sky shortway $\rm rsutcs \ (W\ m^{-2})$ implied cloud response wet deposition rate flux at TOA - arctic at TOA - arctic of BC - arctic 1.2e+00 8.2e-15 Ē 0.0e+00 drybc (kg $m^{-2} s^{-1}$ rsutcs (W 1e+00 0e+00 wetbc (kg m⁻² rlutcs -4 0e-01 -2e-01 0.0e+00 0e+00rsut rlut + 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 dry deposition rate of SO4 – arctic wet deposition rate of SO4 – arctic total deposition rate of BC – arctic dry deposition rate wet deposition rate of SO2 - arctic of SO2 - arctic 0.0e+00 dryso2 (kg m^{-2} s⁻ wetso2 (kg m⁻² s⁻ wetso4 (kg m $^{-2}$ s $^{-}$ ∆ dryso4 (kg m⁻² s⁻ -5.0e-15 0e+00 -1.0e-100+00 -8.6e-15 2000 2001 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 total deposition rate ambient aerosol optical total cloud cover - arctic convective cloud cover - are of S - arctic thickness at 550nm - arctic 2.5e-02 0e+00 2e-01 0.0e+00 (percent) ∆ clt (percent) (percent $(kg m^{-2} s^{-1})$ 0e+00 -2.5e-02 0e+00 3e-14 -2e-02∆ cltc \ | | | -5e-01 0e+00 -3e-02-01 -7.5e-0220002001200220032004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year Year ice water path - arctic column mass burden column mass burden column mass burden surface concentration of DMS - arctic of BC - arctic of SO4 - arctic of SO2 - arctic 6e-07 0e+00 2.0e-07 Δ loadso4 (kg m⁻²) loadbc (kg m⁻²) $_{ m \Delta}$ loadso2 (kg m $^{-2}$ ∆ dms (kg kg − 1 0e+00 1e-12 -1e-04 1.0e-07 -4e-09 5.0e-08 -2e-040e+00 -8e-09 0.0e+00

 Δ emibc (kg m⁻² s⁻¹)

 Δ rlut (W m – 2)

 $\Delta \operatorname{rsutcs} (\operatorname{Wm} - 2)$

wetbc (kg m^{-2} s⁻¹

∆ drybc +

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

 Δ clivi (kg m⁻²)

2000 2001 2002 2003 2004

Year

