arctic: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - no-so4 of SO2 - no-so4 of BC - no-so4 of SO4 - no-so4 of SO2 - no-so4 8e-04 -5.0e+00 5 0e-01 6e-04 5e+00 0.0e+00 4e+00 3e+00 2e-04 2e+00 0e+00 -1.5e+002000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year upwelling longwave flux at TOA – no-so4 upwelling shortwave flux at TOA – no–so4 upwelling clear-sky longwav flux at TOA - no-so4 net radiative flux incident shortwave flux at TOA - no-so4 at TOA - no-so4 2e-07 4e-02 4e-02 1e-07 2e-02 rsut 2e-02 5e-01 5e-01 ∆ rlutcs ∆ rsut ∆ rlut + ı 00+00 0e+00 -1e-07 -2e-02 2002 2003 2004 2001 2002 2003 2004 2000 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 Year Year Year Year Year dry deposition rate of BC – no–so4 upwelling clear-sky shortway clear-sky net radiative implied cloud response wet deposition rate flux at TOA - no-so4 flux at TOA - no-so4 at TOA - no-so4 of BC - no-so4 rsutcs) 5e-01 4e-01 5e-01 4e-01 rsutcs rlutcs -6e-01 3e-01 3e-01 2e-01 3e-01 2e-01 ∆ rlutcs + rsut – 1e-01 0e+00 0e+00 -1e-01 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2002 2003 2004 2000 2001 2000 2001 2000 2001 Year dry deposition rate of SO2 – no–so4 total deposition rate of BC – no–so4 wet deposition rate of SO4 – no-so4 wet deposition rate dry deposition rate of SO2 - no-so4 of SO4 - no-so4 4.0e+00 1e+00 4e+00 0e+00 3.5e+00 00+00 ∆ dryso2 wetso4 3e+00 3.0e+00 -2e+00 -1e+00 2.5e+00 -6e+00 -3e+00 20+00 2.0e+00 -2e+00 1.5e+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 Year $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - no-so4 convective cloud cover - no-s of S - no-so4 thickness at 550nm - no-so 1e+00 0e+00 0e+00 ∆ od550ae 0e+000e+00-2e+01 능 -3e-01 کا اکا 0e+00 -4e+01 -5e-01 -4e+00 -2e+00 -6e+01 -9e-0 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 20002001200220032004 2000 2001 2002 2003 2004 Year Year Year Year Year ice water path - no-so4 column mass burden column mass burden column mass burden surface concentration of DMS - no-so4 of BC - no-so4 of SO2 - no-so4 of SO4 - no-so4 2e+00 2.5e+01 5e-01 2.0e+01 ∆ loadso2 1.5e+01 0e+00 1.0e + 0.1-1e+00 -5e-01 -1e+000.0e+00 -2e+00 -2e+002000 2001 2002 2003 2004

∆ drybc + wetbc

Year

