arctic: absolute difference surface flux of SO2 – bc–no–season surface flux of BC – bc–no–season surface concentration surface concentration of SO4 – bc–no–season surface concentration of SO2 – bc–no–season 0.0e+00 1e+00 36-02 2e+01 4e+00 mmrbc (kg kg-1) 5e-01 so2 (kg kg-1) emibc (kg m-2 2e-02 mmrso4 (kg 1e+01 -5.0e+01 2e+00 0e+00 0e+00 _7 5e+01 -5e-01 0e+00 2002 2003 2002 2003 2002 2003 2002 2003 2001 2001 2002 2003 2001 2001 2001 Year Year Year Year Year upwelling longwave flux at TOA – bc-no-season upwelling shortwave flux at TOA – bc–no–season incident shortwave flux at TOA – bc–no–season upwelling clear-sky longwav flux at TOA - bc-no-seaso net radiative flux at TOA - bc-no-season 8e-08 7.5e-02 0.0e+00 rlut + rsut (W m-2) 6e-08 rlutcs (W m-2) rsut (W m-2) rsdt (W m-2) 5.0e-02 4e-01 4e-02 4e-08 2.5e-02 -8e-01 0.0e+00 0e+00 -2.5e-02 2003 2003 2001 2002 2001 2002 2003 2001 2002 2003 2004 2001 2002 2001 2002 2003 Year Year Year Year upwelling clear-sky shortwa clear-sky net radiative dry deposition rate wet deposition rate total deposition rate flux at TOA - bc-no-seaso flux at TOA - bc-no-seasc of BC - bc-no-season of BC - bc-no-season of BC - bc-no-season drybc + wetbc (kg m-2 s-1)1e+01 0.0e+00 1.5e+01 2e+01 drybc (kg m-2 s-1) wetbc (kg m-2 s-1) ≥ 1.0e+01 -5.0e-01 0e+00 1e+01 ·lutcs + rsutcs 5.0e+00 -1.0e+00 -1e+01 0e+00 -1.5e+00 -1e+01 -5.0e+00 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2001 2003 2001 2002 2003 Year Year Year Year Year + wetso2)/2 + (dryso4 + wetso4)/3 (kg m-2 s-1) dry deposition rate of SO2 – bc–no–season wet deposition rate of SO2 – bc–no–season dry deposition rate wet deposition rate total deposition rate of SO4 - bc-no-season of SO4 - bc-no-season of S - bc-no-season 6e-01 0e+00 wetso2 (kg m-2 s-1) wetso4 (kg m-2 s-1) 4e+00 0e+00 3e-01 (kg m-2 -1e+00-2e+00 0e+00 2e+00 -1e+00 dryso4 -3e-01 0e+00 2003 2001 2003 2001 2003 2003 2003 Year Year Year (dryso2 Year ambient aerosol optical total cloud cover convective cloud cover percentage - bc-no-season 0e+00 3e-01 cltc (%) clt (%) 0e+00 -4e+01 -2.5e-01 -6e+01 2002 2003 2002 2003 2002 2003

Year

GFDI

OsloCTM3

MIROC

NorESM2

UKESM

GEOS

emibc (kg m-2 s-1)

rlut (W m-2)

rsutcs (W m-2)

dryso2 (kg m-2 s-1)

od550aer

Year

Year

GISS

CESM1

E3SM