NH-indian: percent difference surface flux surface flux surface concentration surface concentration surface concentration of BC - bc-no-season of SO2 - bc-no-season of SO4 - bc-no-season of SO2 - bc-no-season 0.0e+00 2e-01 -2e+00-2.5e+01 0e+00 -4e+00 4e-02 mmrs -5.0e+01 2e+00 -2e-01 2e-02 -6e+00 -8e+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 upwelling longwave flux at TOA – bc–no–season upwelling clear-sky longwaflux at TOA - bc-no-sease net radiative flux upwelling shortwave flux incident shortwave flux at TOA - bc-no-season at TOA - bc-no-season at TOA - bc-no-season 1e+00 2e-07 2.5e-01 1e+00 1e-07 0.0e + 0.0∆ rlut+ rsu 5e-01 ∆ rsut 0.0e+00 0e+00 -2.5e-0 -2e-07 -5.0e-0 -1.5e-01 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 Year Year Year Year Year upwelling clear–sky shortwav flux at TOA – bc–no–seaso dry deposition rate of BC – bc–no–season clear-sky net radiative implied cloud response wet deposition rate flux at TOA - bc-no-seaso at TOA - bc-no-season of BC - bc-no-season rsutcs) 0.0e + 0.01.5e+00 1.5e+00 rlutcs rsu 1.0e+00 1.0e+00 1.0e+00 1.0e+00 -2e+00 0e+00 rsut – 5.0e-01 -4e+00-7.5e+000.0e + 0.00.0e+00 -6e+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 dry deposition rate of SO2 – bc–no–season wet deposition rate of SO2 – bc–no–season dry deposition rate of SO4 – bc–no–season wet deposition rate of SO4 – bc–no–season total deposition rate of BC - bc-no-season 0.0e+00 2e+004e-01 -5.0e+00 ∆ dryso4 0e+00 20+00 2e+00 -1.0e+01 0e+00 0e+00 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 Year Year Year Year total deposition rate ambient aerosol optical total cloud cover - bc-no-sea convective cloud cover - bc-no-s surface cloud cover - bc-no-se of S - bc-no-season thickness at 550nm - bc-no-se 1e+01 1e+01 ∆ clt ا کا کا 5.0e-01 5e+00 0e+00 -1e+00 0.0e+00 _6e+01 0e+00 -1e+01_8e+01 20002001200220032004 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 ice water path - bc-no-seas surface concentration column mass burden column mass burden column mass burden of DMS - bc-no-season of BC - bc-no-season of SO2 - bc-no-season of SO4 - bc-no-season 8e-0 3e+002.5e+00 7.5e+00 4e-01 2e+00 ∆ dms 5.0e+00 0.0e+00 load -2e+001e+00 2.5e+00 0e+00 -2.5e+00 -4e+00 0e+00 0.0e+00

-6e+00

E3SM

GEOS

GFDL

2002 2003 2004

OsloCTM3

UKESM

Year

GISS

MIROC

NorESM2

2002 2003 2004

Year

2000 2001 2002 2003 2004

Year

∆ emibc

 $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$

-4e-01

2000 2001

2002 2003 2004

CAM5

CESM1

CESM2

Year

2000 2001 2002 2003 2004

Year