SH-land: percent difference surface flux surface flux surface concentration surface concentration of BC - so2-at-height of SO2 - so2-at-height of BC - so2-at-height of SO4 - so2-at-height of SO2 - so2-at-height 0e+00 2e-01 0e+00 Δ emibc -2e+00 -5e-05 5.0e+00 _2e_01 -6e+01 -1e-04 0.00+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 upwelling longwave flux at TOA – so2–at–height upwelling clear-sky longwa flux at TOA - so2-at-heig net radiative flux upwelling shortwave flux incident shortwave flux at TOA - so2-at-height at TOA - so2-at-height at TOA - so2-at-height 1e-01 1e-01 rsut 0e+00 ∆ rsut rlut + 1 5e-02 2.5e-02 _1__07 0e+00 0.0e+00 -2e-07 0.0e+00 -1e-01 -5e-02 2002 2003 2004 2000 2001 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 2000 2001 Year Year Year Year Year clear-sky net radiative flux at TOA - so2-at-heigh upwelling clear–sky shortwav flux at TOA – so2–at–heigh implied cloud response dry deposition rate wet deposition rate at TOA - so2-at-height of BC - so2-at-height of BC - so2-at-height rsutcs) 5e-01 2e-01 rsutcs rlutcs -1e-01 ∆ wetbc 1e-01 ∆ rsutcs 1e-01 0e+00 0e+00 rsut – 0e+00 00+00 -1e-01 -1e-01 -1e-01 -5e-01 -2e-0 2002 2003 2004 2002 2003 2004 2002 2003 2004 2000 2001 2000 2001 2000 2001 2002 2003 2004 2000 2001 2002 2003 2004 2000 2001 Year Year total deposition rate dry deposition rate of SO2 – so2–at–height wet deposition rate dry deposition rate of SO4 – so2–at–height wet deposition rate of SO4 – so2–at–height of BC - so2-at-height of SO2 - so2-at-height 1e+00 1.5e+01 -2e+01 2.0e+01 1.5e+01 ∆ drybc + wetbc wetso4 0e+00 1.0e+01 5.0e+00 5.0e+00 -5e-01 -5e+01 0.0e+00-1e+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 Year Year $\frac{1}{3} dryso2 + wetso2)/2 + \frac{1}{3} dryso4 + wetso4)/3$ total deposition rate ambient aerosol optical total cloud cover - so2-at-he convective cloud cover - so2-atsurface cloud cover - so2-at-h of S - so2-at-height thickness at 550nm - so2-at-h 1e+01 0e+00 ∆ od550ae -2e+01 0.0e+00 0e+00 -1e+01 -2e+01 -3e-01 -6e+01 -3e+010.0e+0020002001200220032004 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 - so2-at-heigh surface concentration column mass burden column mass burden column mass burden of DMS - so2-at-height of BC - so2-at-height of SO2 - so2-at-height of SO4 - so2-at-height 5.0e-01 1.5e+01 1e+00 4e-01 0.0e+00 2e-01 0e+00 -5.0e-01 1.0e+01 0e+00 5.0e+00 -1.0e+00-1e+00-2e-01 5.0e+00 0.0e+00 -4e-01 -1.5e+002000 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

CAM5

CESM1

CESM2

E3SM

GEOS

GFDL

GISS

MIROC

NorESM2

OsloCTM3

UKESM