bc-no-season: percent difference surface flux of BC – land surface flux of SO2 – land surface concentration of BC – land surface concentration of SO4 – land surface concentration of SO2 – land 0.15% 0% 6% 0.1 -25% 0.1% ∆ emiso2 ∆ mmrbc ∆ mmrso4 ∆ emibc 4% 0% 0.05% -75% -0.1% 0% -100% 2002 2001 2003 2001 2003 2004 2001 2003 2001 2002 2003 2001 2002 2003 Year Year Year Year Year incident shortwave flux at TOA – land clear-sky longwave flux at TOA - land longwave flux at TOA shortwave flux at TOA net radiative flux land at TOA - land land 4e-08% 0.08% ∆ (rlut + rsut) 2e-08% -0.25% -0.3% 0.04% 0.04% 0% -0.5% 0% -0.6% 0% -08% 2001 2003 2001 2002 2003 2001 2003 2002 2003 2001 2002 2003 Year Year Year Year Year -sky shortwaveflux clear-sky net radiative implied cloud response dry deposition rate wet deposition rate at TOA - land flux at TOA - land at TOA - land of BC - land of BC - land 0.6% (rlut + rsut – rlutcs – rsutcs) 0% 8% Δ (rlutcs + rsutcs) 0% 0.4% ∆ rsutcs △ wetbc -0.5% ∆ drybc 0.2% 0% 0% 2003 2001 2003 2001 2003 2001 2003 2001 2002 2003 2001 Year Year Year Year Year wet deposition rate of SO4 – land total deposition rate dry deposition rate wet deposition rate dry deposition rate of BC - land of SO2 - land of SO2 – land of SO4 – land 10% 0.4% 6% ∆ (drybc + wetbc) 0.2% 5% ∆ dryso2 ∆ wetso2 ∆ dryso4 ∆ wetso4 4% 0% 0% 0% -0.2% 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 2001 2002 2003 2004 Year convective cloud cover $\Delta \left(\text{dryso2} + \text{wetso2} \right) / 2 + \left(\text{dryso4} + \text{wetso4} \right) / 3$ total deposition rate ambient aerosol optical total cloud cover thickness at 550nm - land percentage - land percentage - land 0.4% -20% -40% -0.8% -60% -0.4% 2002 2003 2004 2002 2003 2002 2003 2001 2002 2003 2004 2001 2004 2001 2004 2001 Year Year Year Year OsloCTM3 CESM₁ F3SM **GFDI** MIROC

CESM2

GEOS

GISS

NorESM2

UKESM