Supplement of

The effect of snow/sea ice type on the response of albedo and light penetration depth (e-folding depth) to increasing black carbon

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**Figure S1** – Albedo of snow with increasing mass-ratio of black carbon (absorption cross-section of light absorbing impurities) and scattering cross-section, at wavelengths 300, 400, 550 and 700 nm and densities of 200, 400, 600 kg m$^{-3}$. 
Figure S2 – Sea ice albedo with increasing mass-ratio of black carbon (absorption cross-section of light absorbing impurities) and scattering cross-section, at wavelengths 300, 400, 550 and 700 nm and sea ice densities of 700, 800, 900 kg m$^{-3}$. 
Figure S3 – Snow e-folding depth with increasing mass-ratio of black carbon (absorption cross-section of light absorbing impurities) and scattering cross-section, at wavelengths 300, 400, 550 and 700 nm and snow densities of 200, 400, 600 kg m$^{-3}$. 
Figure S4 – Change in sea ice e-folding depth with increasing mass-ratio of black carbon (absorption cross-section of light absorbing impurities) and scattering cross-section, at wavelengths 300, 400, 550 and 700 nm and densities of 700, 800, 900 kg m$^{-3}$. 