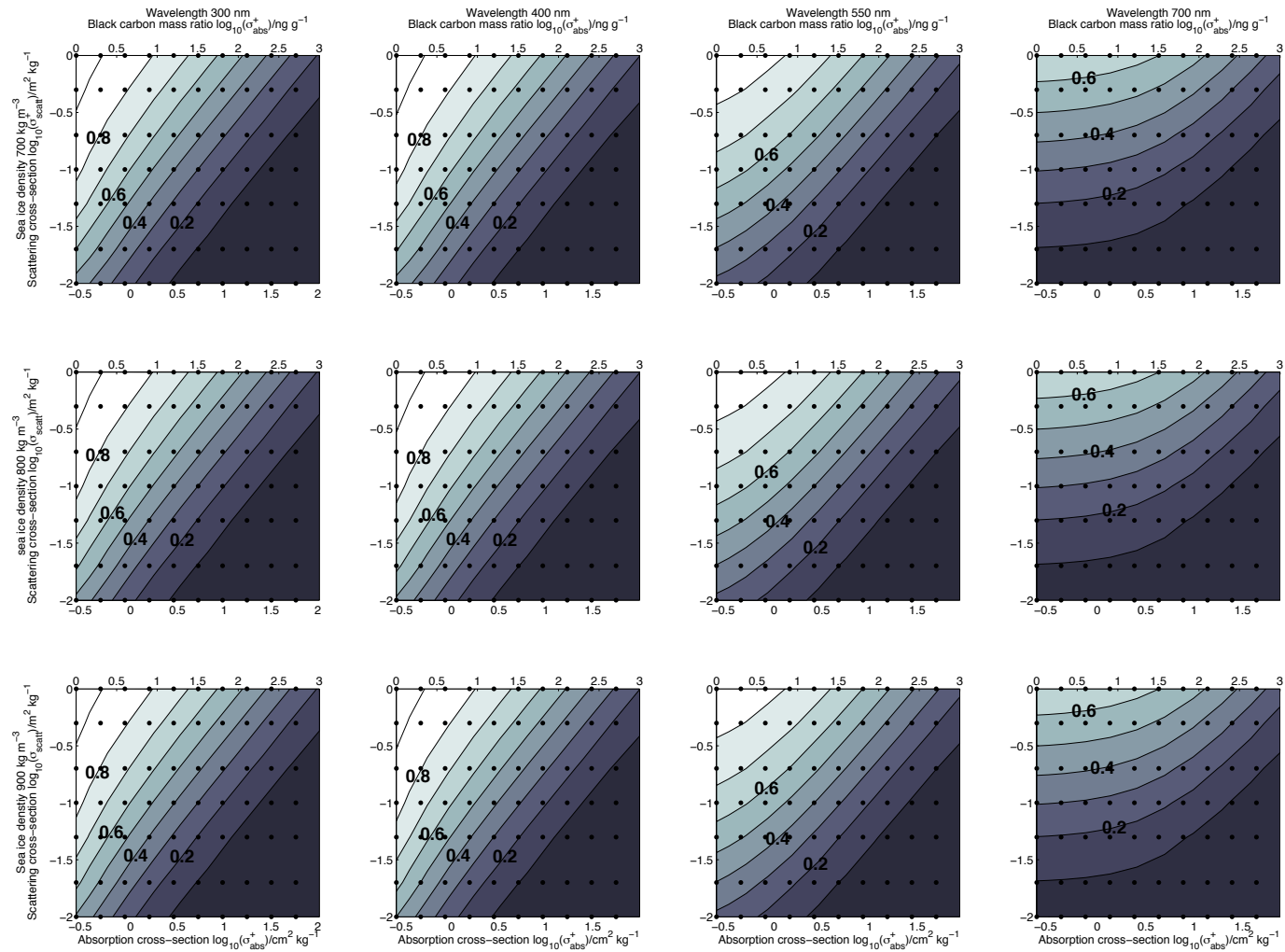
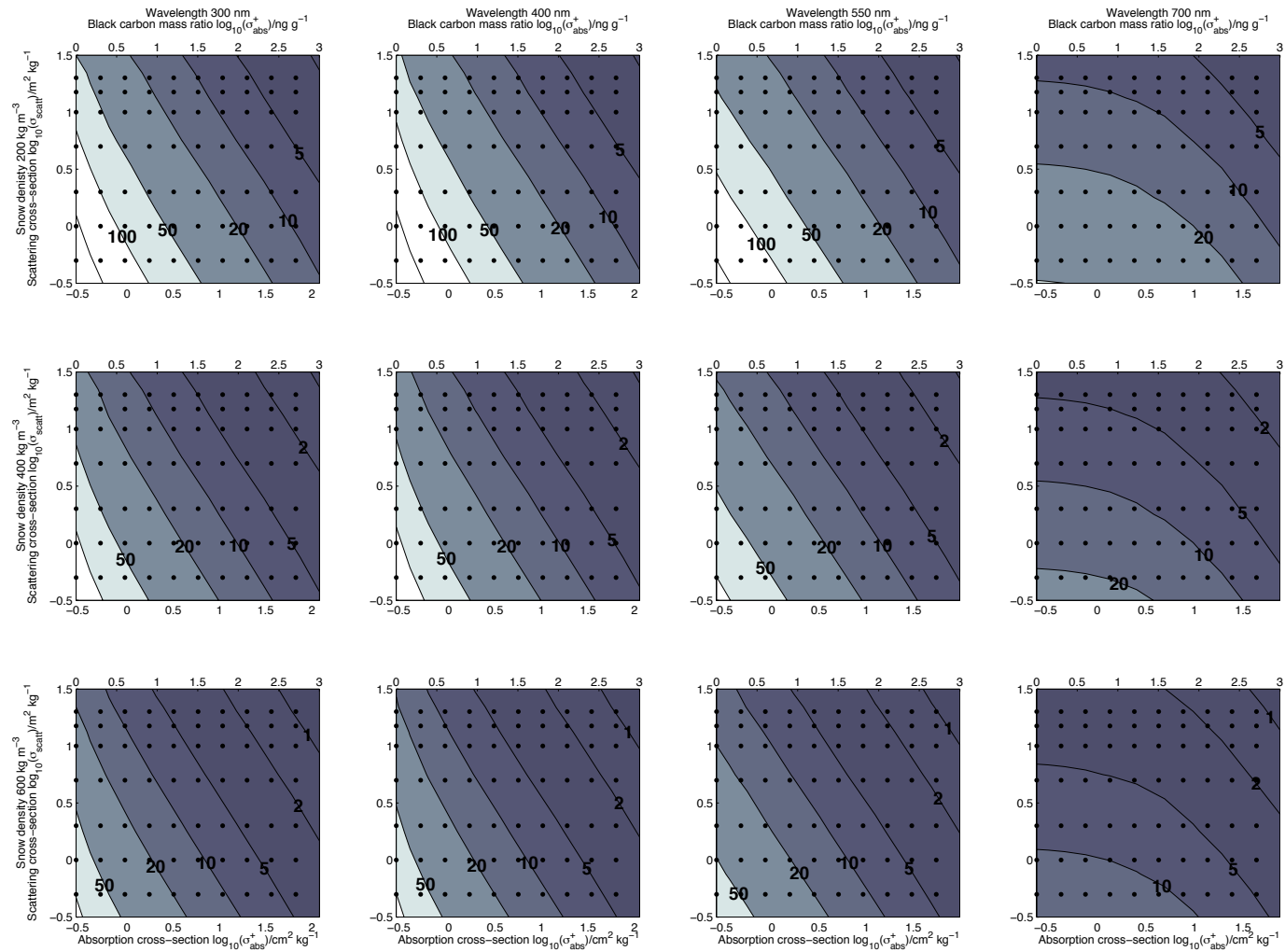


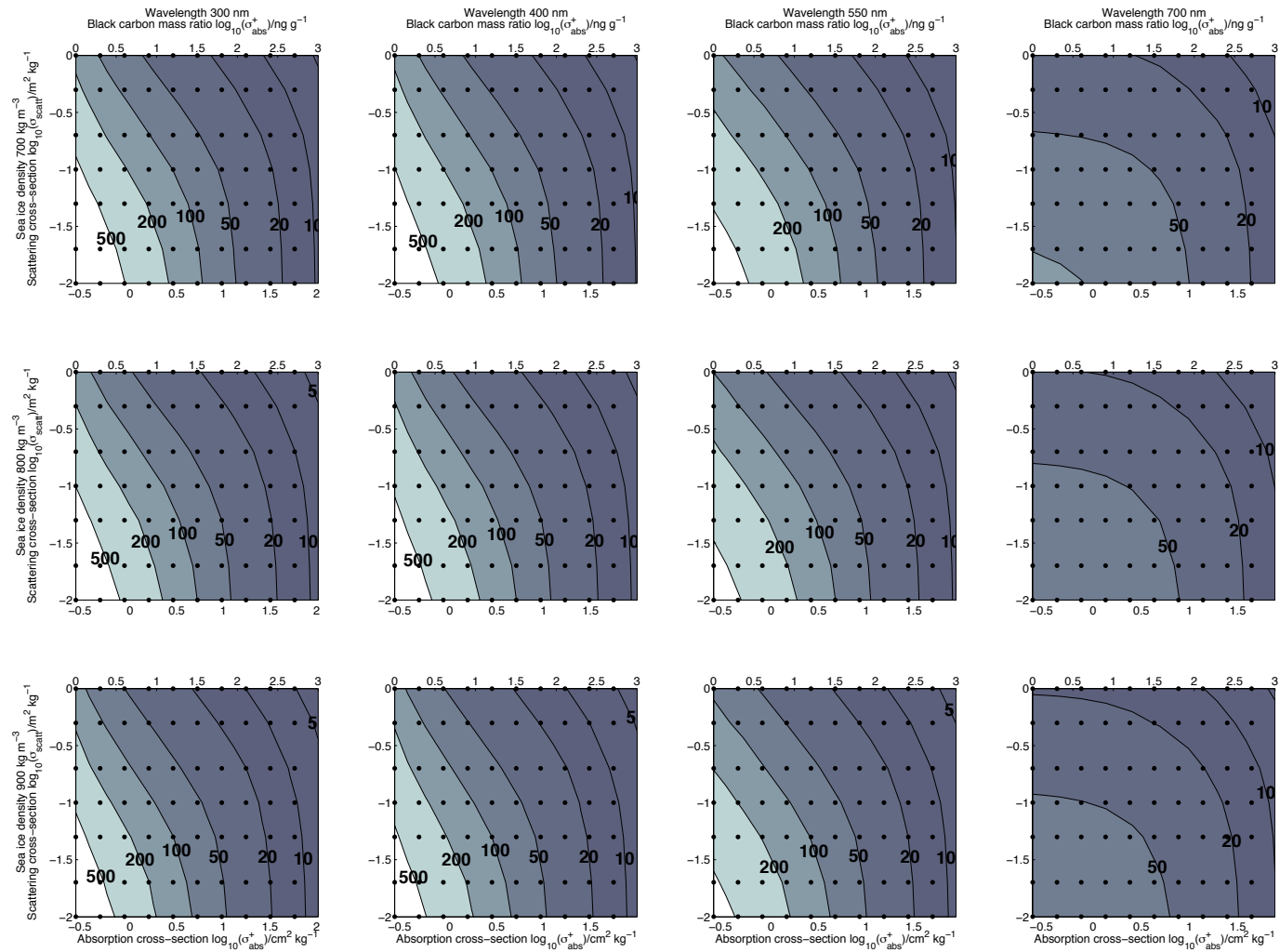
**Figure S1** – Albedo of snow with increasing mass-ratio of black carbon (absorption cross-section of light absorbing impurities) and scattering cross-section, at wavelengths 300, 400, 550 and 700 nm and densities of 200, 400, 600 kg m<sup>-3</sup>.



**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<sup>-3</sup>.



**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<sup>-3</sup>.



**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<sup>-3</sup>.