Supplement of The Cryosphere, 11, 2867–2881, 2017
https://doi.org/10.5194/tc-11-2867-2017-supplement

The Cryosphere
Open Access

Supplement of

Optical properties of sea ice doped with black carbon – an experimental and radiative-transfer modelling comparison

Amelia A. Marks et al.

Correspondence to: Martin D. King (m.king@rhul.ac.uk)

Supplementary data

The supplementary data includes extra ice core data and measurements of the reflectance of the water in the tank (before freezing).

Ice core data

Ice core data from cores taken before and after the black carbon is added for each run (1–4) with a different black carbon loading (0, 75, 150 and 300 ng g^{-1}). Salinity, temperature and density is measured for each core and brine salinity, density and brine and air volume are derived using equations by Cox and Weeks (1983). A photograph of each core is also shown.

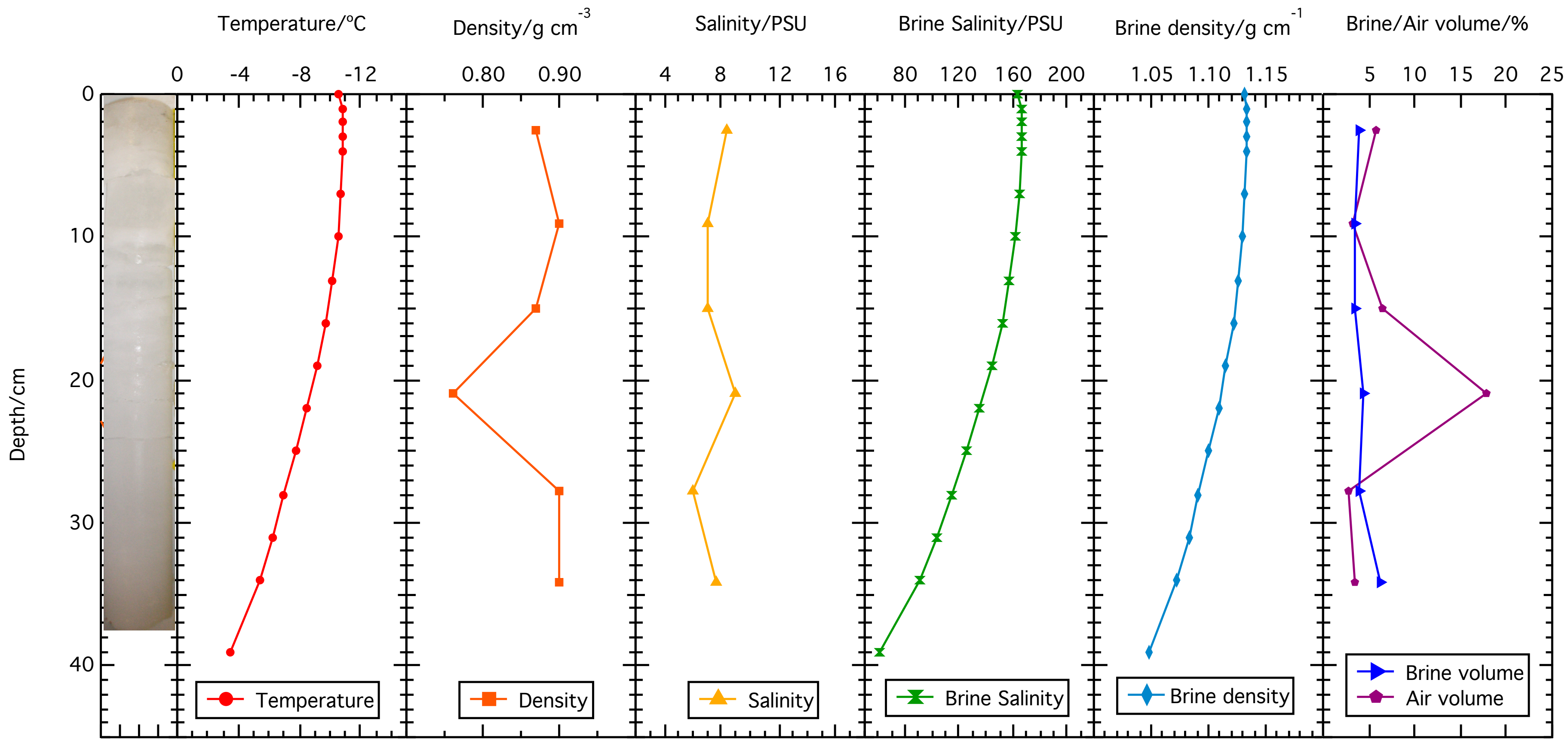

Figure 1 **– Run 1 before black carbon doped layer added** *Physical ice properties for bottom undoped ice layer, before black carbon doped layer added for run 1. Temperature, density and salinity are measured from core sections, while brine salinity, brine density and brine and air volume are derived from equations of Cox and Weeks (1983). Photo of the ice core is also shown*

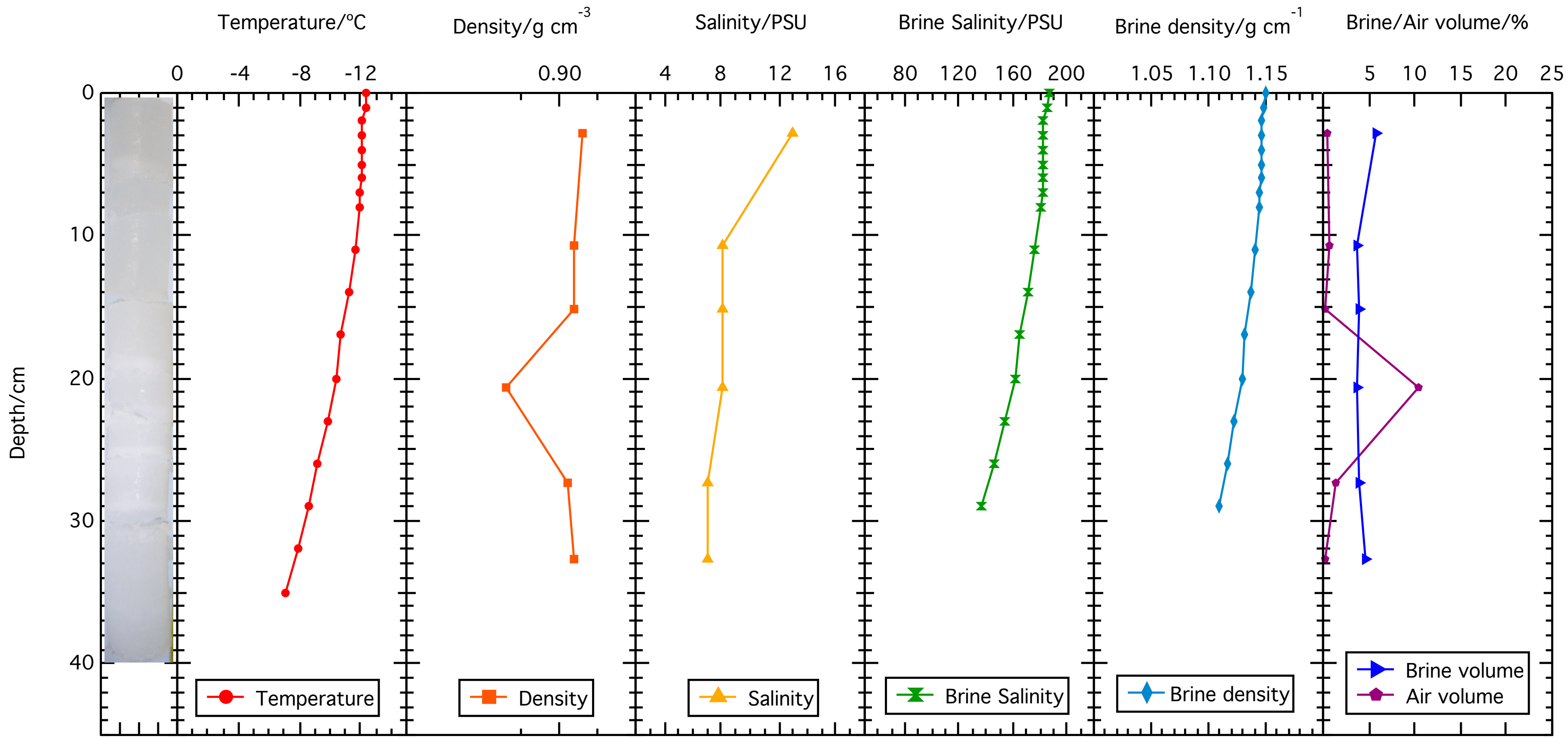

Figure 2 – **Run 1 after 0 ng g^{-1} black carbon doped layer added** *Physical ice properties for bottom undoped ice layer and additional 0 ng g^{-1} black carbon doped layer for run 1. Temperature, density and salinity are measured from core sections, while brine salinity, brine density and brine and air volume are derived from equations of Cox and Weeks (1983). Photo of the ice core is also shown*

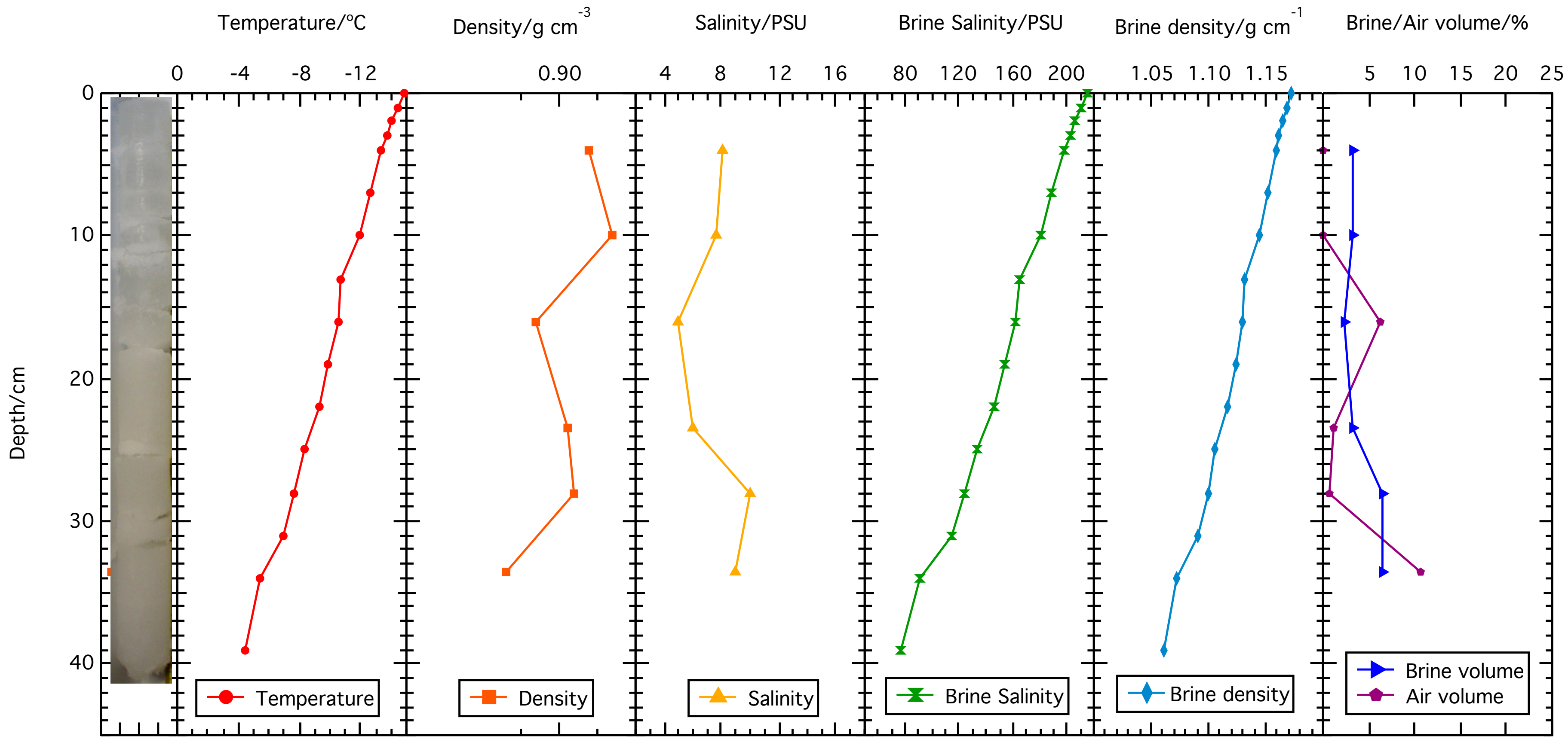

Figure 3 – **Run 2 before black carbon doped layer added** *Physical ice properties for bottom undoped ice layer, before black carbon doped layer added for run 2. Temperature, density and salinity are measured from core sections, while brine salinity, brine density and brine and air volume are derived from equations of Cox and Weeks (1983). Photo of the ice core is also shown*

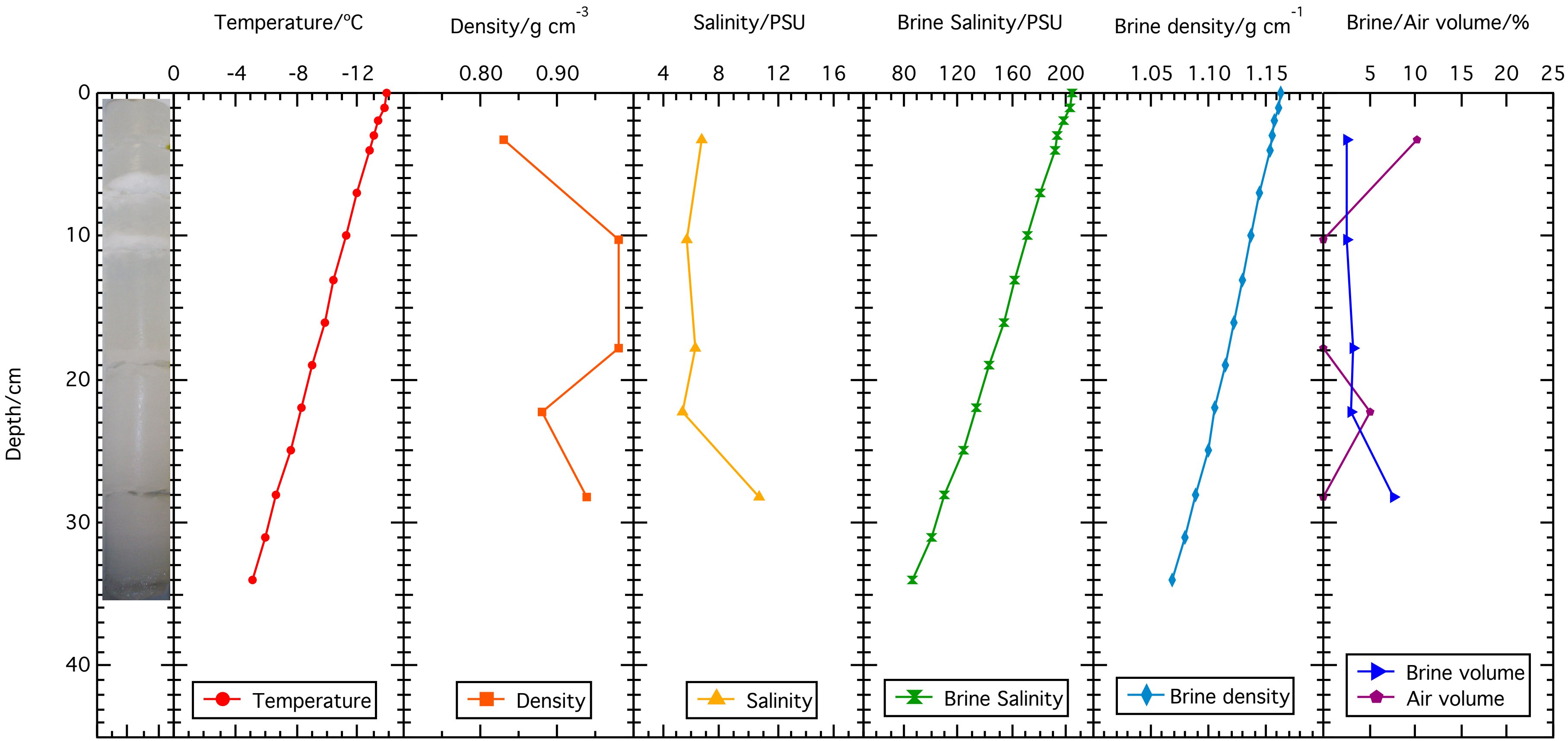

Figure 4 – **Run 3 before black carbon doped layer added** *Physical ice properties for bottom undoped ice layer, before black carbon doped layer added for run 3. Temperature, density and salinity are measured from core sections, while brine salinity, brine density and brine and air volume are derived from equations of Cox and Weeks (1983). Photo of the ice core is also shown*

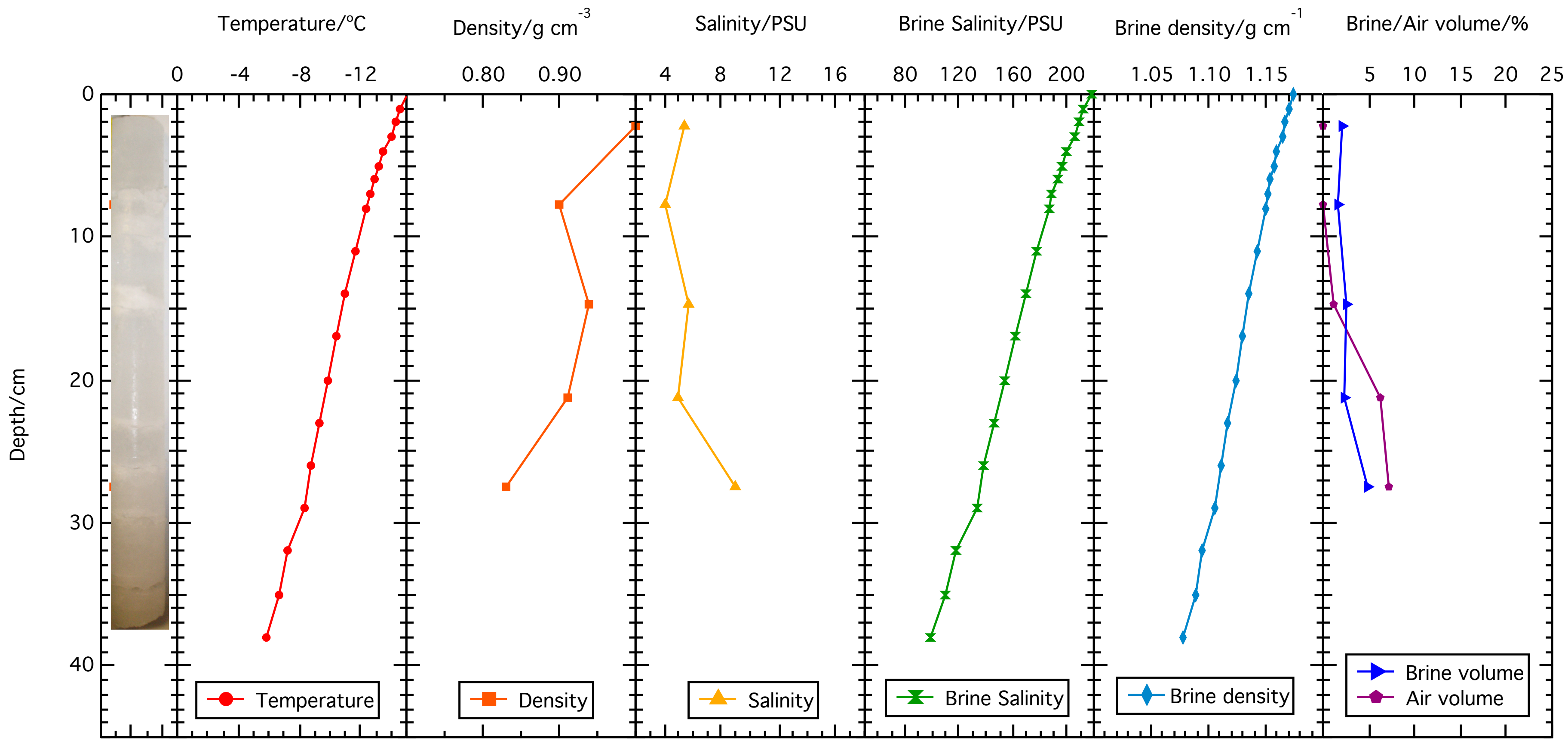

Figure 5 – **Run 3 after 150 ng g^{-1} black carbon doped layer added** *Physical ice properties for bottom undoped ice layer and additional 150 ng g^{-1} black carbon doped layer for run 3. Temperature, density and salinity are measured from core sections, while brine salinity, brine density and brine and air volume are derived from equations of Cox and Weeks (1983). Photo of the ice core is also shown*

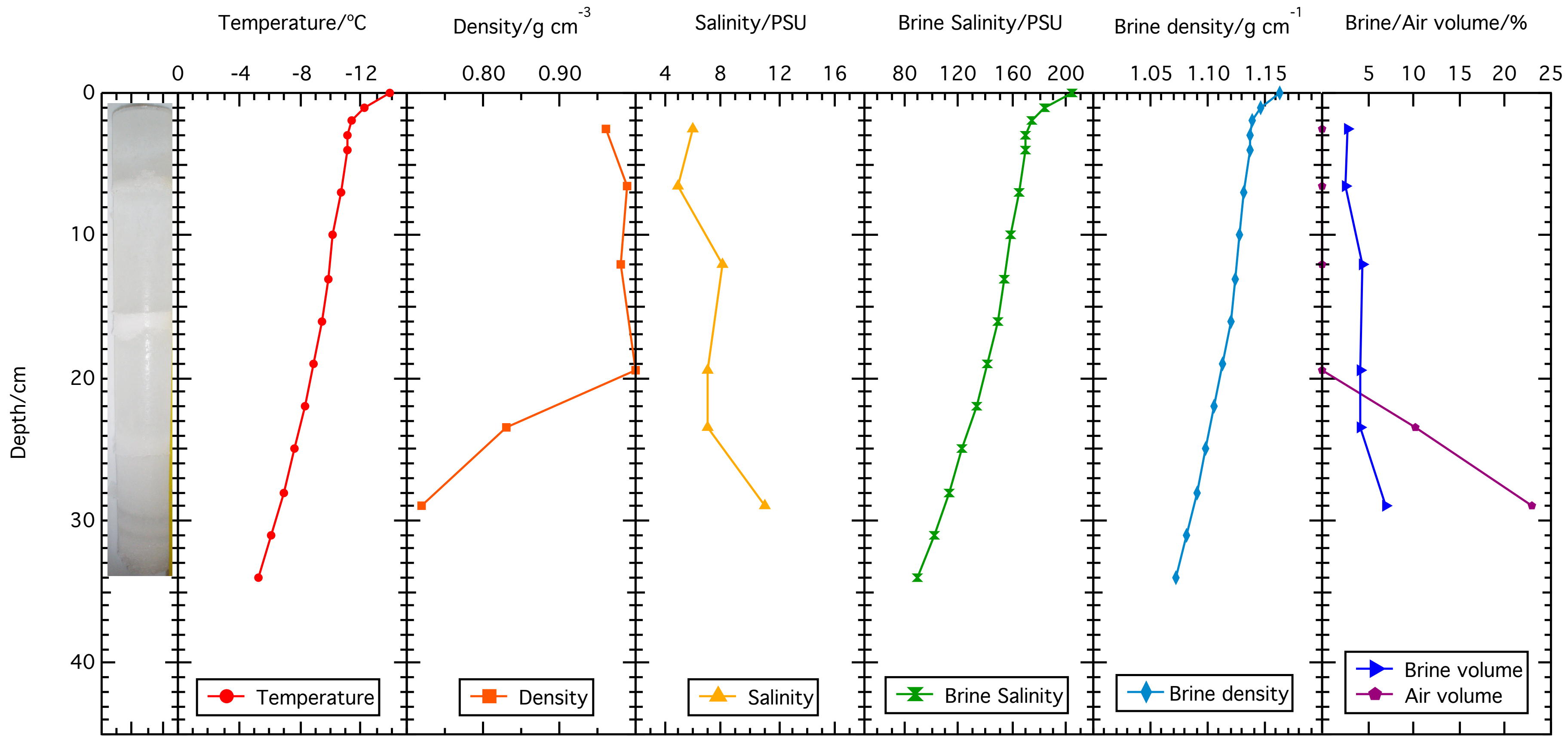

Figure 6 **– Run 4 before black carbon doped layer added** *Physical ice properties for bottom undoped ice layer, before black carbon doped layer added for run 4. Temperature, density and salinity are measured from core sections, while brine salinity, brine density and brine and air volume are derived from equations of Cox and Weeks (1983). Photo of the ice core is also shown*

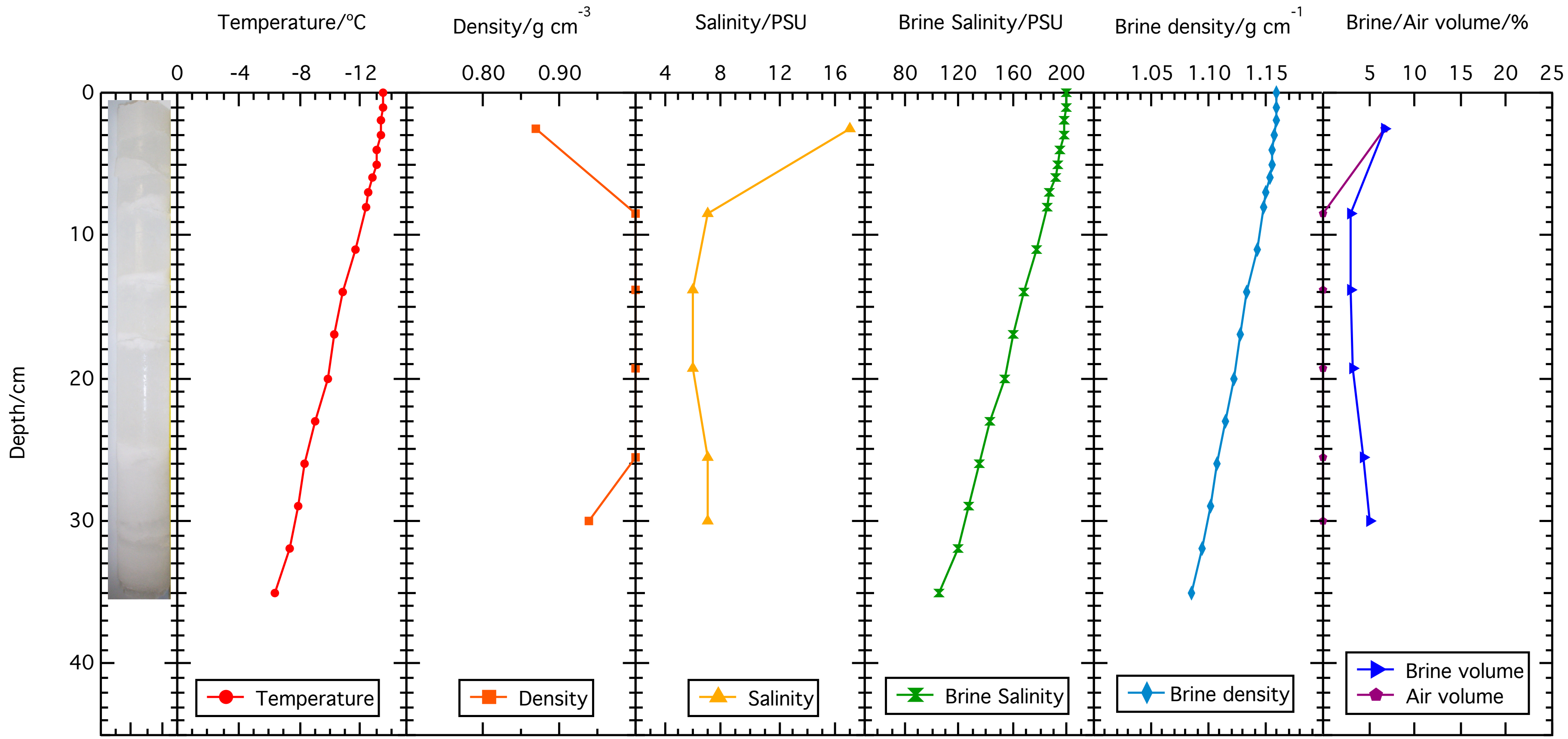

Figure 7 – **Run 4 after 300 ng g^{-1} black carbon doped layer added** *Physical ice properties for bottom undoped ice layer and additional 300 ng g^{-1} black carbon doped layer for run 4. Temperature, density and salinity are measured from core sections, while brine salinity, brine density and brine and air volume are derived from equations of Cox and Weeks (1983). Photo of the ice core is also shown*

Under ice reflectance measurements

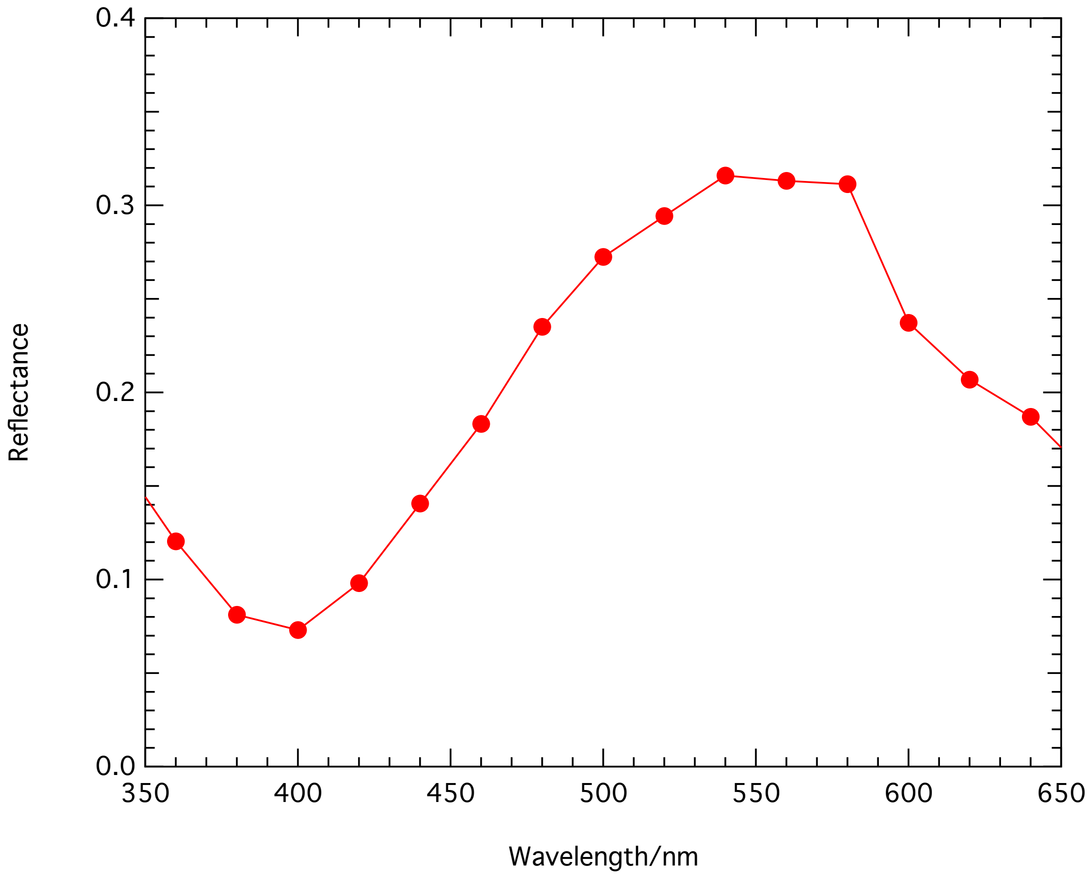

Figure 8 *– Reflectance measurements taken of the water in the tank before freezing commenced, these measurements are used to represent the under ice reflectance in the TUV-snow model*