**Figure S1.** Image of the SML sampling plate in use during surface microlayer collection. The scientists charged of this sampling at the time were Dr Manuel Dall’Osto and Ana Sotomayor-Garcia.

**Figure S2.** Images of PNF taken using epifluorescence (a) and confocal (b) microscopy at 1000× magnification, showing a *Phaeocystis*-like species. Scale bar: 5 µm. The confocal image appears larger due to the application of digital zoom after the image was captured.

**Figure S3.** Example of a cytogram showing (A) Blank with TE (Tris-EDTA buffer) and (B) the different viral population (V1-V4), and prokaryote signatures (HNA: bacteria with high nucleic acid content and LNA: bacteria with low nucleic acid content)