Antarctic and Arctic snows have been found to contain aeolian-derived diatoms. The composition of aeolian-derived particles can be used to track the source regions of air-masses. Particles filtered from snow taken from the Wilkins Runway and surrounds in the Windmill Islands, East Antarctica were examined under a scanning electron microscope and with electron dispersive spectrometry analysis to identify the particle type and likely source. Around 20 species of diatoms were found in snow taken after an unusual weather event, with winds blowing at 10 m s\(^{-1}\) from a north-westerly direction, a dramatic change from the usual easterly direction. All diatom species found were of marine origin and the majority of species have been found previously in the local waters and sediments. This is unusual, as diatoms previously found in Antarctic and Arctic snows are typically of freshwater origin. Back-trajectory models were performed to trace the origin of the weather event. It was found that the source air-mass was derived from a local coastal area, causing heavy snowfall to the site with exotic particles such as diatoms and the sea-ice derived mineral ikaite (CaCO\(_3\cdot6\)H\(_2\)O). This study has implications for the identification of source regions of aeolian-derived particles found preserved within ice cores. This unusual event contributed many unusual particles that are not normally found at the site under prevailing conditions. Therefore, the interpretation of climatic conditions and pollution histories obtained from ice cores may be confused by the unusual weather conditions that contribute most of the snow accumulation budget to the site.