Comparing with field observations, the ECMWF re-analyses significantly underestimate the amplitude of the annual cycle of surface atmospheric temperature at Dome C on the Antarctic plateau. Or could it rather be that the observations overestimate summer temperature? To measure fixed-point atmospheric temperature, solid-state thermometers are traditionally housed in shields that shade the sensor from solar radiation. However, the shield itself is subject to radiation heating that may affect the air sample within the shield and thus the measurement. This is particularly the case over highly reflective surfaces, a typical characteristic of Antarctica even in summer. In 2008, we deployed meteorological instruments along a 45-m tower at Dome C. In the summer, there were occurrences of suspiciously high temperatures when wind speed was low. In 2009, we deployed additional thermometers in mechanically aspirated shields. The measurements confirm that when wind is weak, measurements in passive shields may be biased warm by up to 10°C, in some cases. The AMRC deployed one of its first Antarctic automatic weather stations at Dome C, which provides a long meteorological record on the plateau. Comparing with ventilated temperature measurements, it is also biased warm. It is very likely that most fixed-point temperature reports on the Antarctic plateau are biased warm due to lack of ventilation. This is a matter to be considered when calibrating and validating meteorological models. Aspirated shields are being tested at South Pole to confirm and refine this issue. Coastal temperatures are probably less affected because of a much more windy environment.