

Supplementary Material

Outdoor environmental data and the warming effect.

Analysis of Climate Change in Kvernes have been conducted using available Weather stations data in proximity of the Church site (63.0055° N, 7.7219° E). Two weather stations have been selected and used: the airport weather station: Kristiansund Lufthavn (63.1138° N, 7.8258° E) and Kristiansund N (). Data recording in the first station started in June 1970 and it has been used to compare the monitoring period (2011-2012) outdoors; parallel, the Kristiansund N data recording ranged in the period between March 1946 and December 1975 and it has been used to investigate an homogeneous climate normal period, i.e. the average value of meteorological values over several decades. Usually a period is defined as climatological normal over 30 years, the United Nation's World Meteorological Organization (WMO) requires the calculation of normal every 30 years, with the most used being the 1961-1990. However, in the case of weather stations in proximity of Kvernes, it has been not possible to find RH (%) values over such normal period, from this the reason to select a different time-window as reference interval for our study. The normal climate/ reference period 1957-1975 from the data of the weather station Kristiansund N allows comparing the climate change with the conditions of the monitored period 2011-2012.

Results show that the monitored year has been always warmer than the reference period (Figure 1S), especially in November 2011 and in February-March 2012 with a slightly colder short period in April. The analysis of Temperature evolution indicates an overall high temperature period, as expectable, between the end of June and the end of September 2011, with two additional maxima in October 2011 and half of March 2012 (Figure 1S).

The anomaly has highlighted two spells of drier period in October 2011 and in January 2012 (Figure 2S), just before the peak of temperature anomalies. While, as opposite a more humid period has been detected in March 2012 before the negative anomaly in temperature. These climate conditions outdoors show an enrichment of grams of water vapor over one kg of dry air in average of 1 gr/kg (Figure 3S) although spells of depletion of water vapor exist in conjunction with the drops in RH.

Finally, Figure 4S displays precipitations registered by the Kristiansund Airport meteorological station¹. The data highlight the autumn as the period with most frequent and intense precipitations.

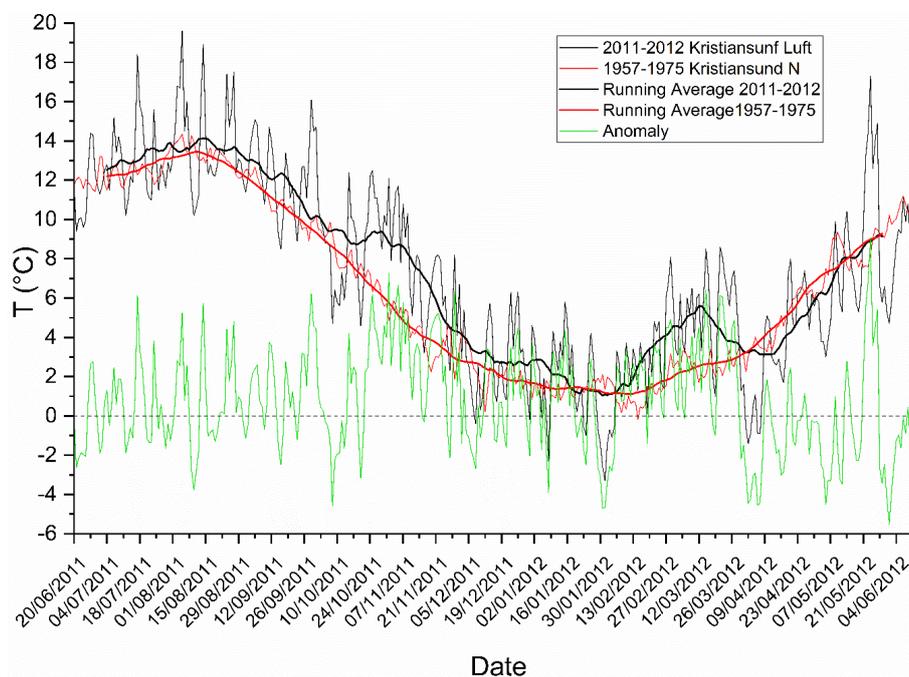


Figure 1S: Upper part - Daily outdoor temperature (°C) registered at the Kristiansund Airport Meteorological station between 20/06/2011 and 13/06/2012 (Thin black line and thick black line for the running average) and at the Kristiansund N Meteorological station for the normal period 1957-1975 (Thin red line and thick red line for the running average). Bottom

¹ http://sharki.oslo.dnmi.no/portal/page?_pageid=73,39035,73_39049&_dad=portal&_schema=PORTA

Part – Temperature Anomaly (°C) (Green thin line) between the data recorded in 2011-2012 and the reference period (1957-1975).

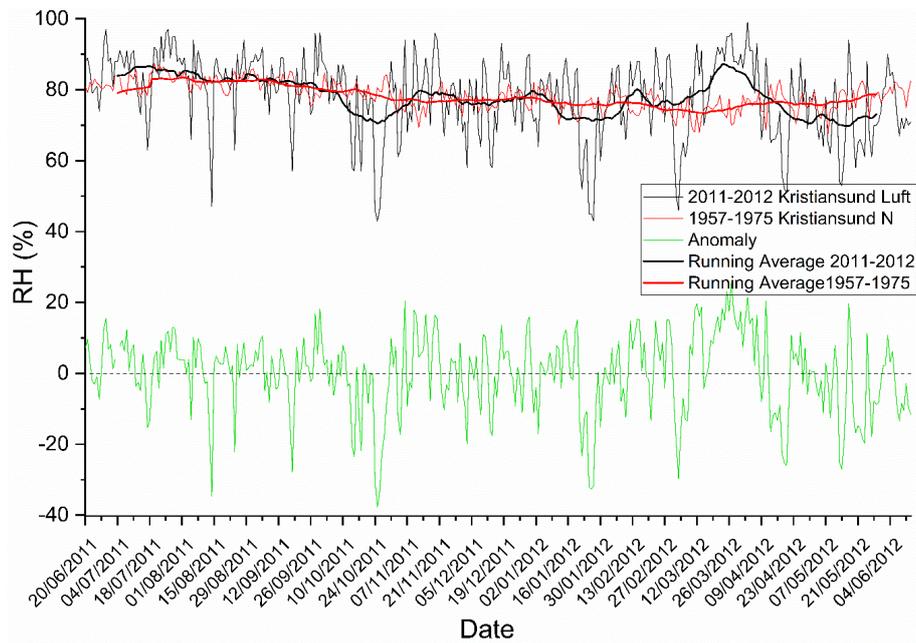


Figure 2S: Upper part - Daily outdoor relative humidity (%) registered at the Kristiansund Airport Meteorological station between 20/06/2011 and 13/06/2012 (Thin black line and thick black line for the running average) and at the Kristiansund N Meteorological station for the normal period 1957-1975 (Thin red line and thick red line for the running average). Bottom Part – RH Anomaly (%) (Green thin line) between the data recorded in 2011-2012 and the reference period (1957-1975).

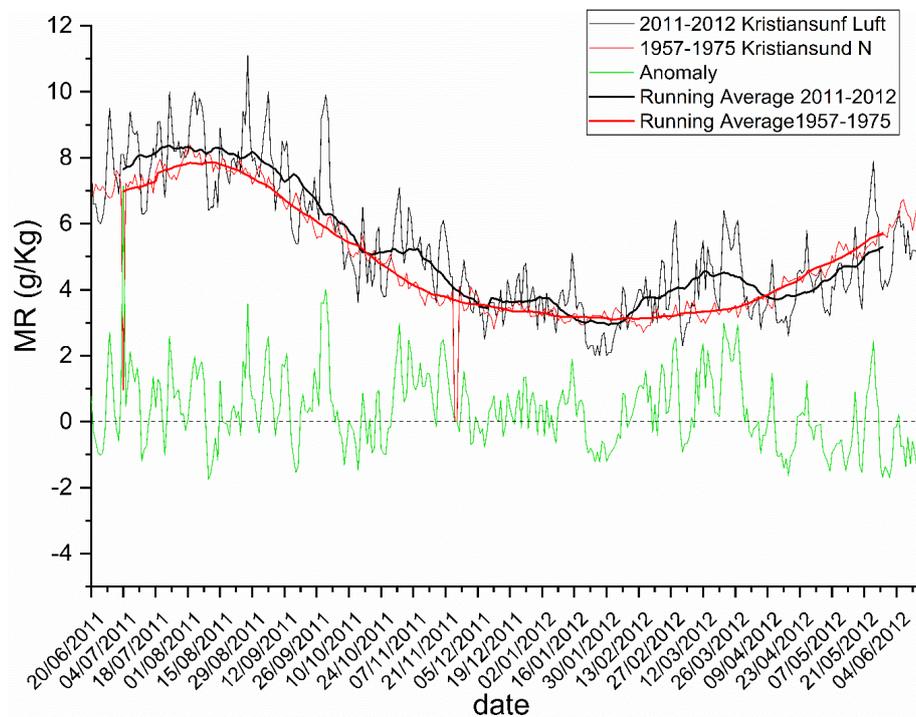


Figure 3S: Upper part - Daily outdoor Mixing Ratio (g/kg) registered at the Kristiansund Airport Meteorological station between 20/06/2011 and 13/06/2012 (Thin black line and thick black line for the running average) and at the Kristiansund N...Meteorological station for the normal period 1957-1975 (Thin red line and thick red line for the running average).

Bottom Part – MR Anomaly (g/kg) (Green thin line) between the data recorded in 2011-2012 and the reference period (1957-1975).

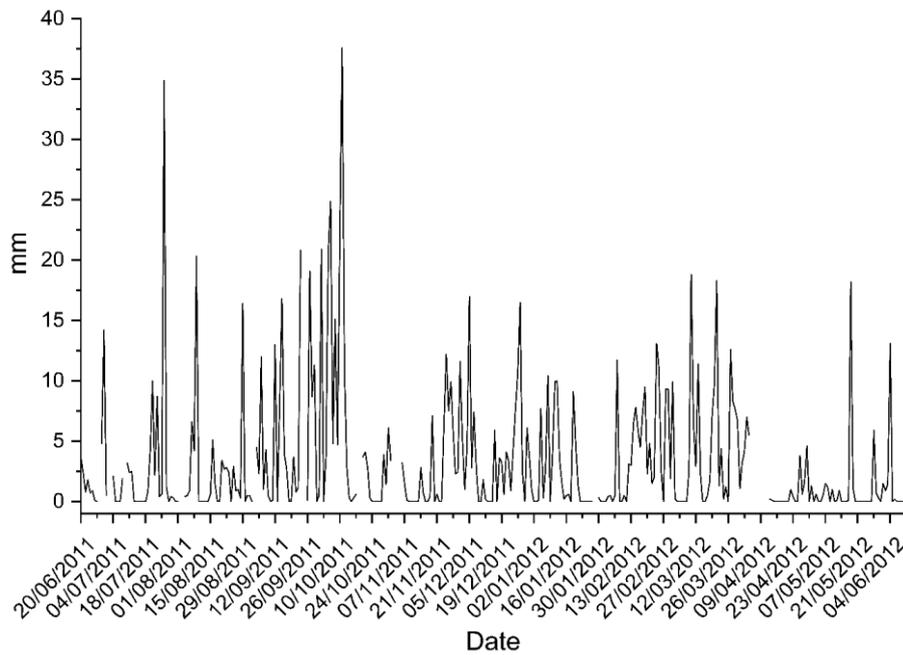


Figure 4S: Daily amount of rain (mm) registered at the Kristiansund Airport Meteorological station between 20/06/2011 and 13/06/2012.

Data Elaboration of Indoor Mixing Ratio

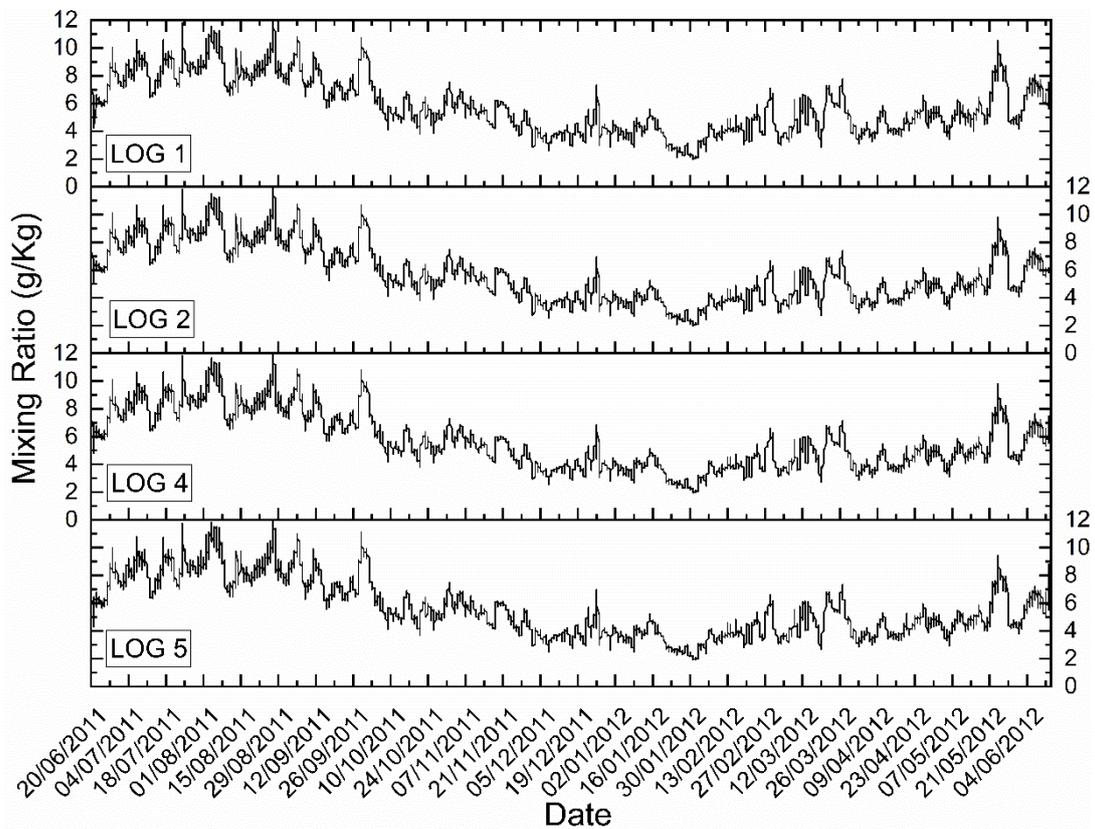


Figure 5S: Indoor mixing Ratio values obtained for the 4 data logger between 20/6/2011 and 13/6/2012 every 2 hours

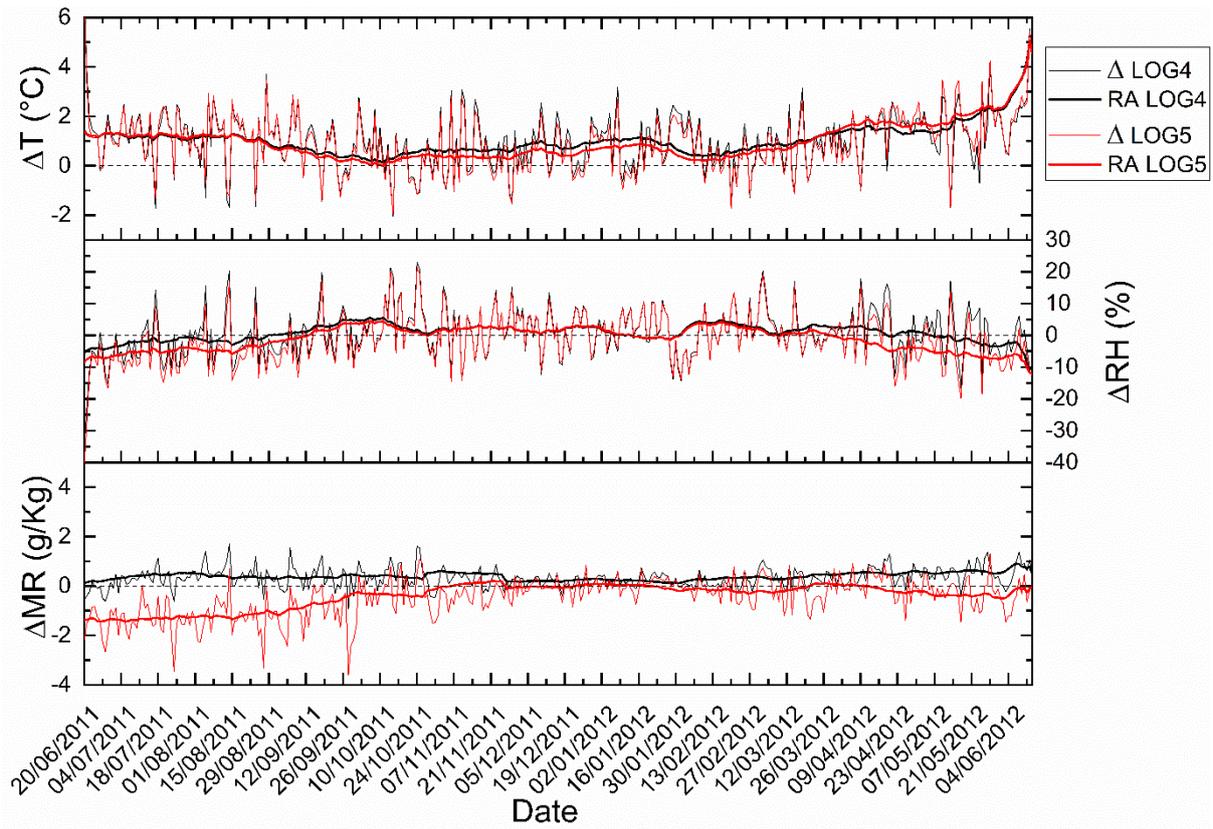


Figure S6: Indoor-outdoor differences for the measured parameters T (°C), RH (%) and calculated parameter MR (g/Kg). Dotted lines indicate the 0 value.

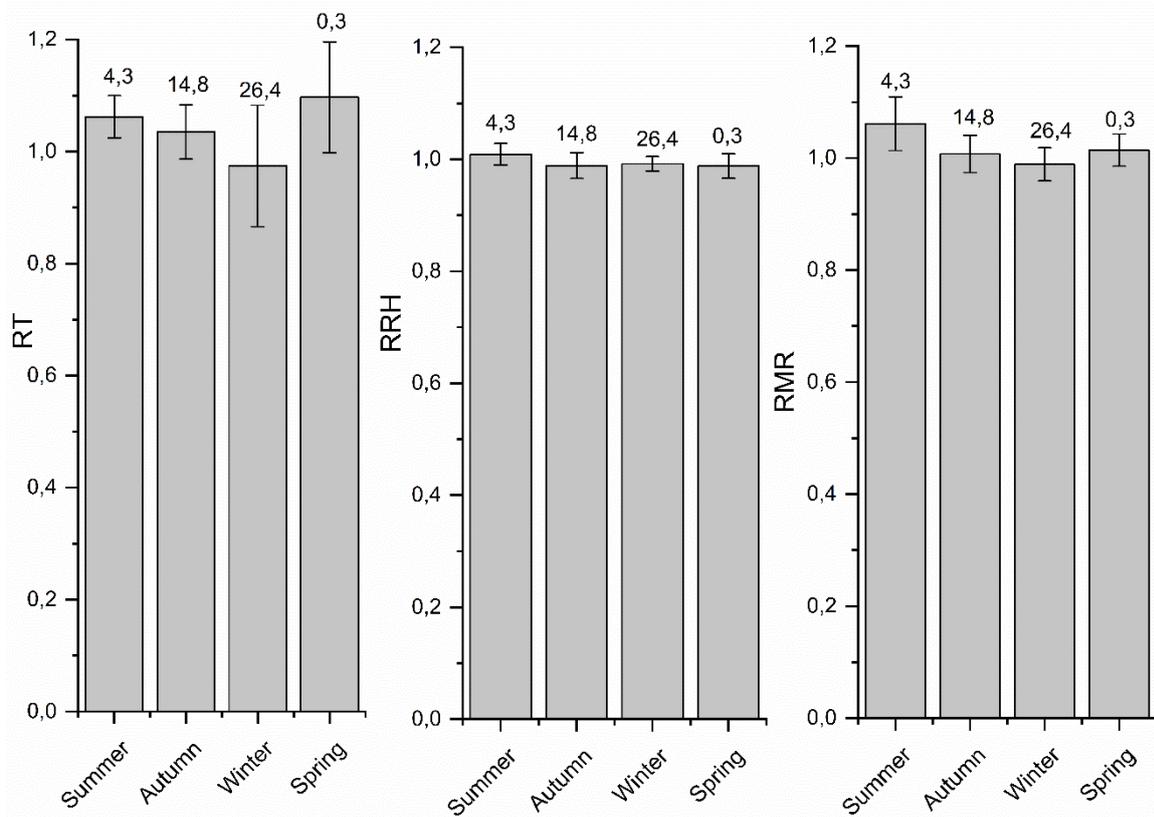


Figure S7: Ratios between outdoor values of T, RH and MR calculated as ratio between average environmental values (RT on the left; RRH in the center and RMR on the right) during daylight and night time periods in the central weeks of the seasons considered for Figures 5 and 6.