

Comparing meteorological data from weather stations and *in situ* data loggers in mangrove areas in South Africa

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Data from weather stations are not always accurate for ecological studies when the distance from the study site to the nearest weather station is large. Therefore it can be useful to measure temperature and relative humidity by means of data loggers at the site of interest, next to records from stations. Deviations are caused by the existence of microclimates. Moreover, for instance in forest ecosystems, *in situ* data can be more explanatory when they are measured at different heights (e.g. in the crown, in the understorey and in the soil at the below ground roots), compared to weather stations where the variables are measured at a specific standard height. When both data sources are available, it is also interesting to compare data from weather stations and data loggers and to define if the deviation is significant.

The study area is the mangrove distribution along the north-south oriented east coast of South Africa. Temperature and relative humidity are available from data loggers in four mangrove sites situated at different latitudes: Mgeni, Mngazana, Nxaxo-Nqusi and the most southern mangrove forest, Nahoon. These data are measured from March 2011 until September 2013. Weather stations that are situated most closely to the mangrove sites, are chosen for the comparison after correction for altitude. Then air temperatures and relative humidities from the stations are compared to *in situ* data in the crown-, the understorey- and the soil-layer. The analyses are done by adapting the method developed by Kollas *et al.* (2012) to the coastal system.

This study domain is very explorative, as there are few cases in which meteorological data from a weather station are compared to *in situ* measurements. Our results are important for the understanding of the impact of climate on the latitudinal limit of mangroves in South Africa and for the ecology of coastal ecosystems in general.

References

Kollas C., C.F. Randin, Y. Vitasse and C. Körner. 2012. Chapter 3: How accurate can weather stations predict temperatures at tree species limits? *Agricultural and Forest Meteorology*. 33-47p.