

Toolik Data Report for 2016

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The following 2016 summary plots give an overview of the data collected at the Toolik Lake meteorological station. A major upgrade to our system this year was the creation of a sensor metadata database that can be accessed online and is downloaded when users download data.

Figure 1: Daily average, maximum and minimum temperatures followed expected seasonal patterns.

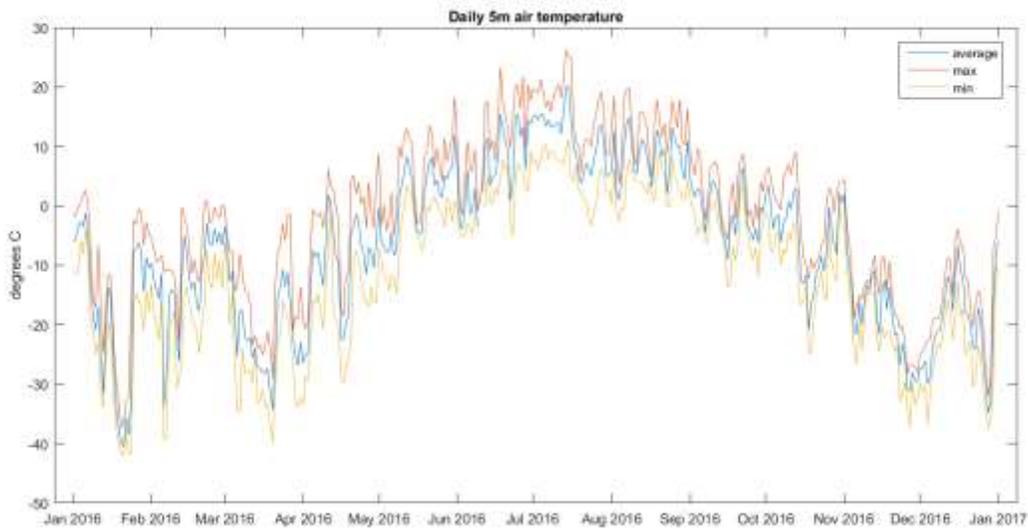


Figure 2: Hourly temperature agreement between the 3 and 5m sensors provides validation for both sensors.

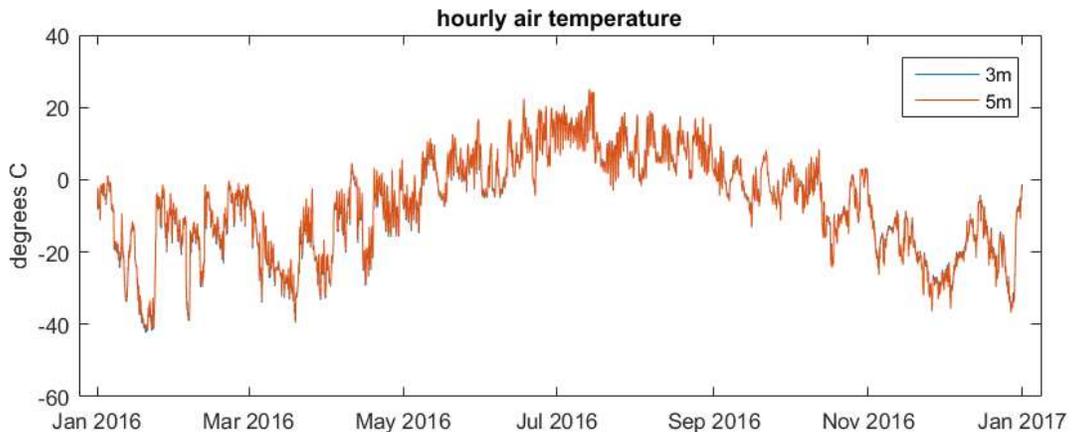


Figure 3: Similar agreement is found between 3 and 5m relative humidity sensors.

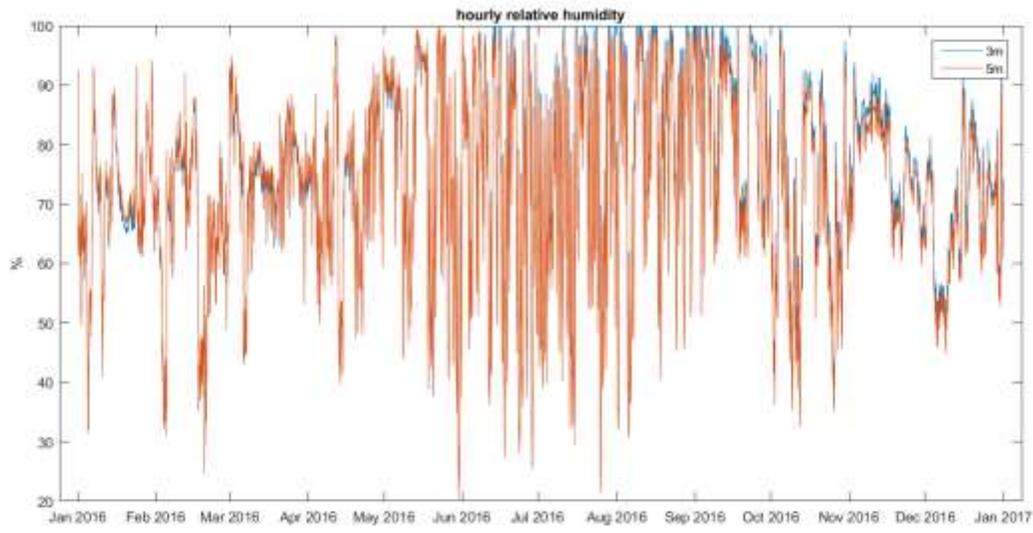


Figure 4: The barometer started working again on January 5th (It had been broken since 9/19/15). Nevertheless, we replaced the sensor on June 9th because we did not want to risk future outages.

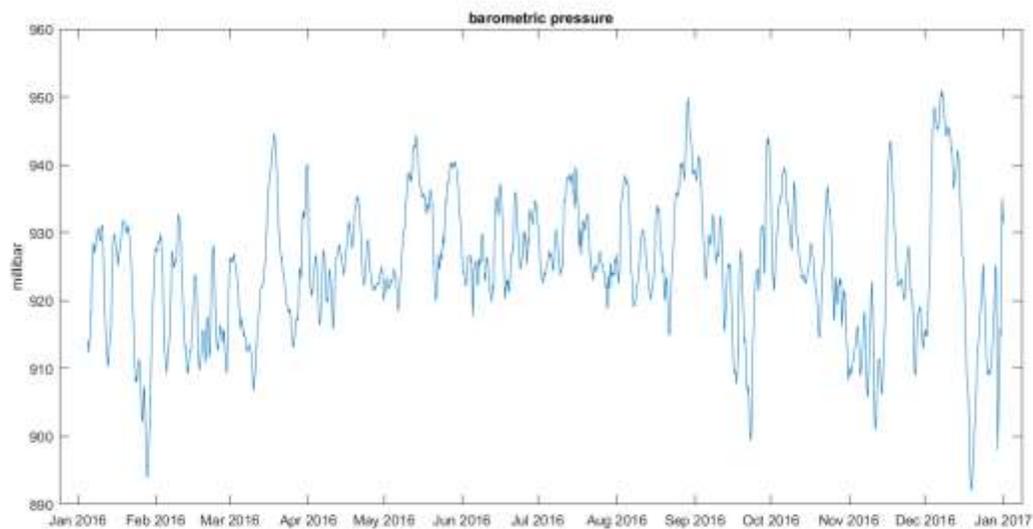


Figure 5: During winter the sensors are affected by rime ice that prohibits the propellers from spinning at low wind speeds. Unfortunately, rime can only build up when there is very little wind, so it is difficult to know if they are reporting low or zero wind speeds due to ice or actual conditions. However, a best attempt was made to replace steady zero values with NAN. A note in the metadata warns of this issue. In June I swapped the R.M. Young Model 5108 wind speed sensor for the model 5106 in order to calibrate the 5106. For 2016, the WS data available through the EDC Data Query page are from the model 5103. Data from the model 5106 and 5108 are available by request.

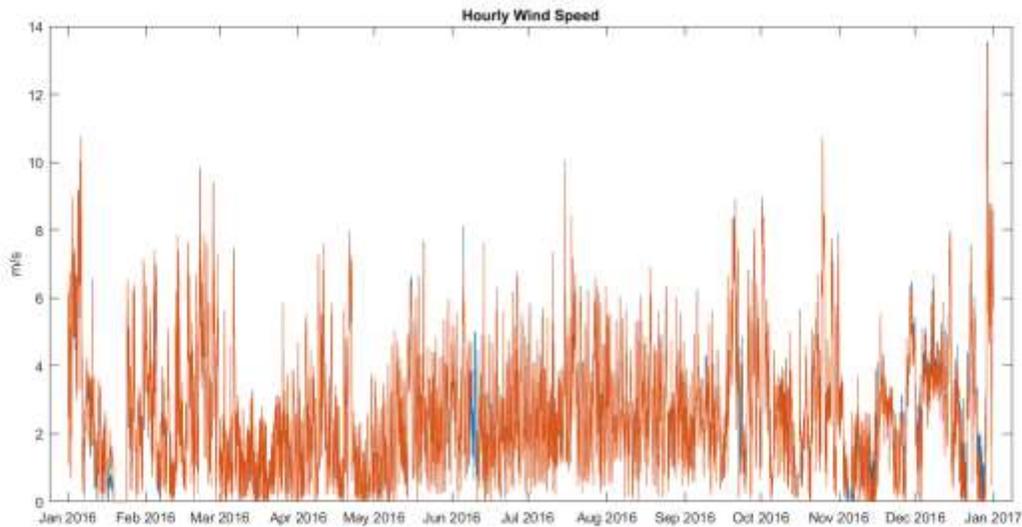


Figure 6

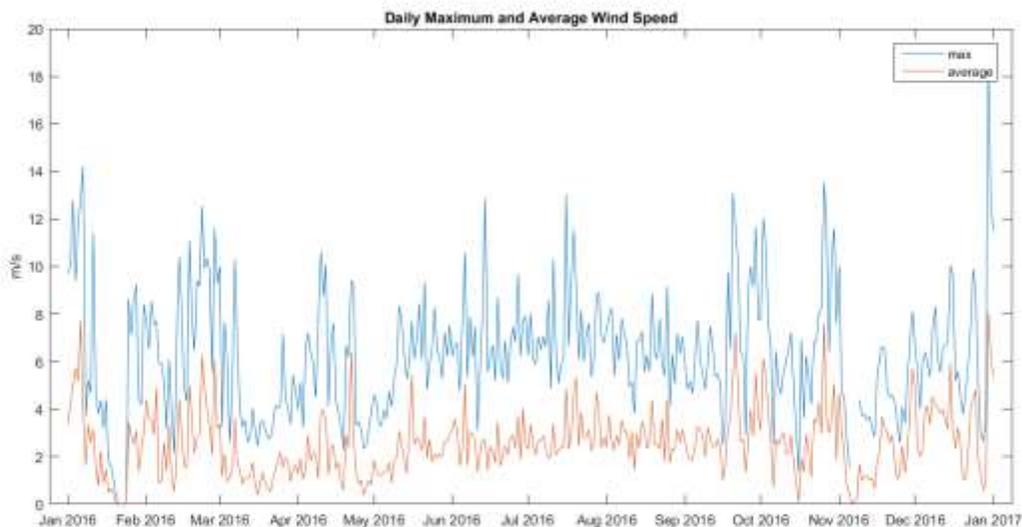


Figure 7: The four components of net radiation measured by the CNR4 show long and short wave incoming and outgoing radiation. The drastic dip in outgoing shortwave radiation marks the snow free season. We also can see the snow storms in June with the peaks in outgoing shortwave.

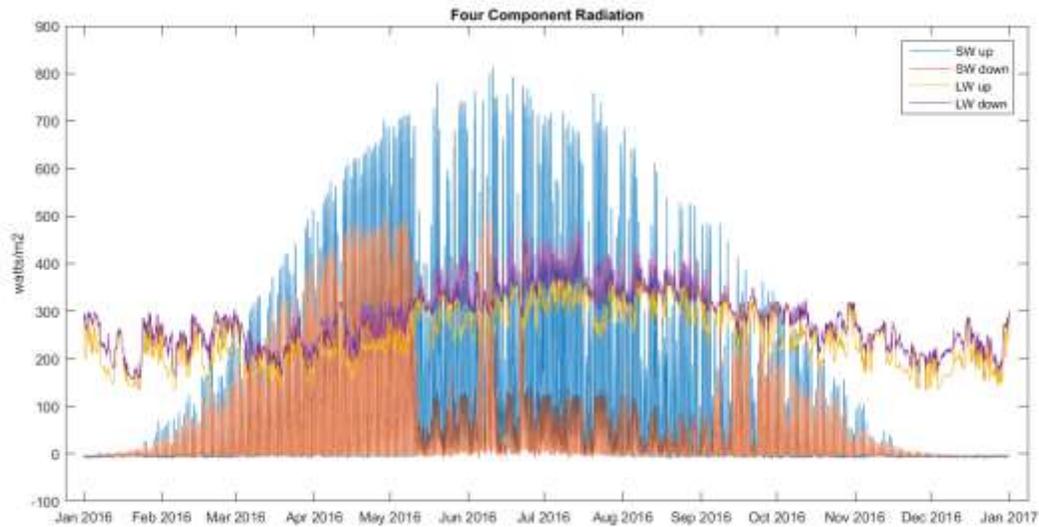


Figure 8

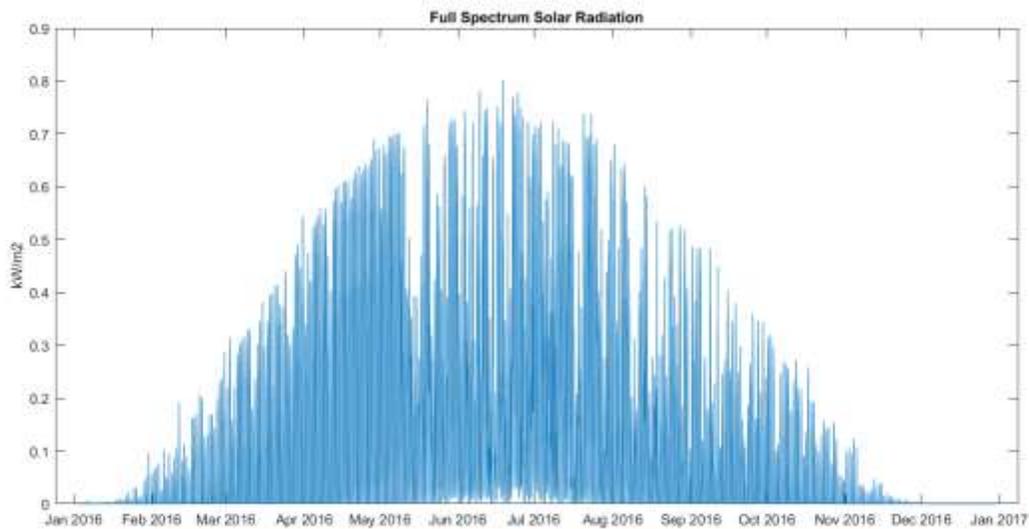


Figure 9: Terrestrial PAR closely follows the trends of total incoming radiation. Underwater PAR is greatly affected by ice cover on the Lake. In late August, the lake PAR sensor was replaced with a clean and calibrated sensor. The spike in readings is mostly likely due the new sensor being clear of algal growth that covered the old sensor because it had not been cleaned in a few years.

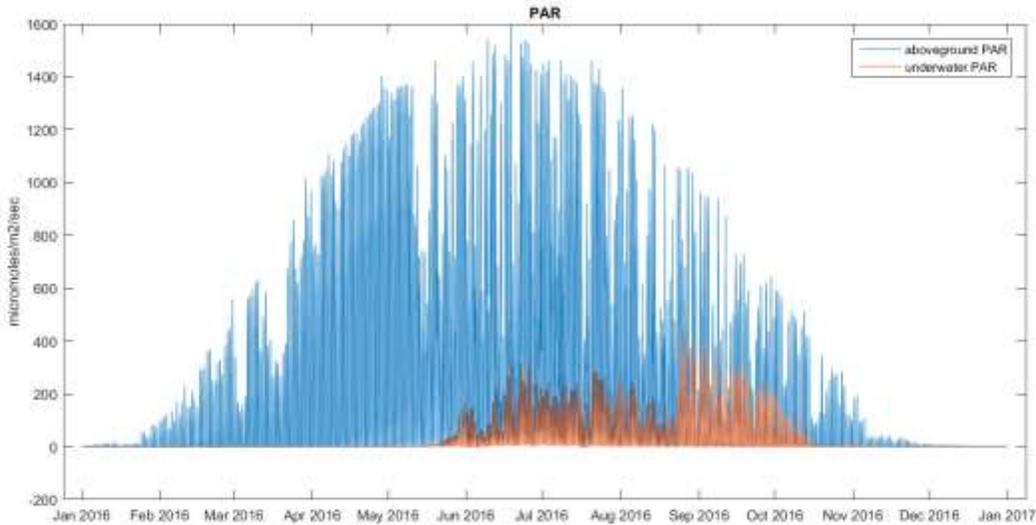


Figure 10: Ownership for both UV sensors was transferred to the University of Michigan this year. Rose Cory and her team will take care of maintenance and calibration and the EDC will continue to handle the data and do minor maintenance like leveling the sensors. The UVA sensor had to be sent back for a second recalibration which led to the large gap in data.

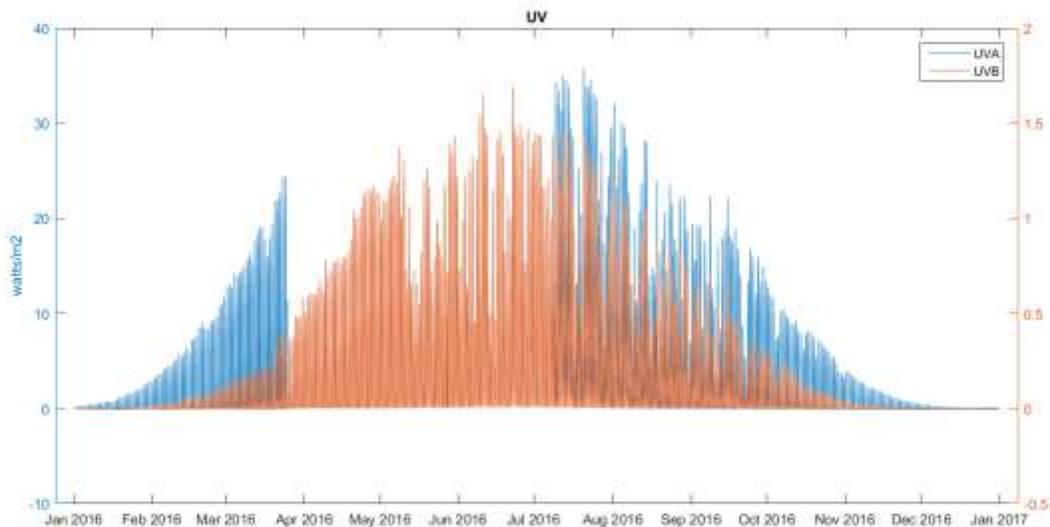


Figure 11: The depth of water in the evaporation pan is a summer only variable.

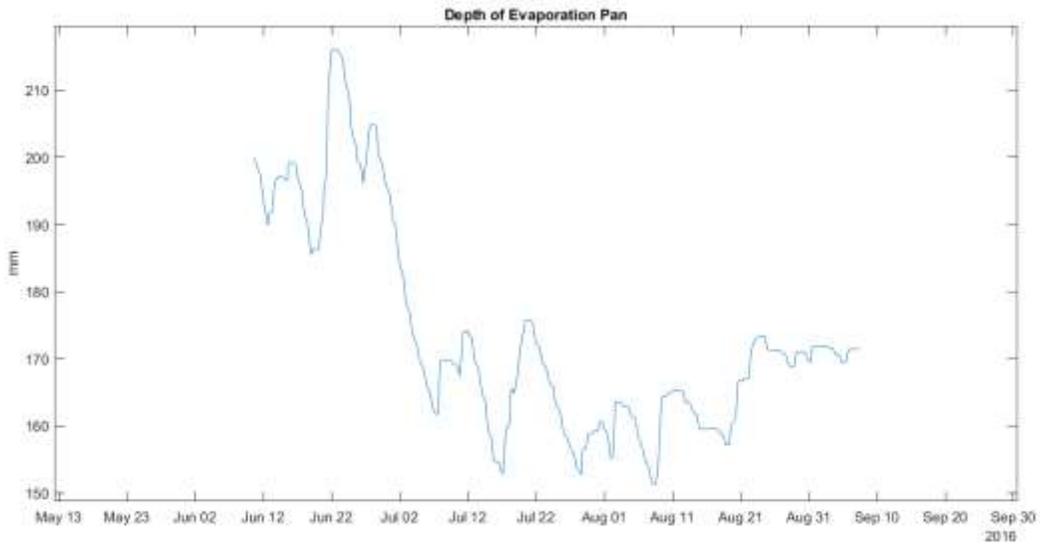


Figure 12: The year round precipitation gauge was out of commission for part of the summer. Our summer tipping bucket was able to cover that outage, however snow events occurred on June 5th, 8th and 21st –two of which were during the outage. The timing and volume of these events were likely not measured accurately by the tipping bucket.

