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Calibrated polarization parameters of the auroral red line in Hornsund

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The thermospheric atomic oxygen red line is one of the brigthest in the auroral spectrum. It has been shown to be polarized. This polarization depends on the auroral activity. The first measurements were performed in polar conditions with a possible contribution of light pollution. In the winter 2010 / 2011, it has been measured for the first time in totally dark conditions at the Polish Hornsund polar base.

About 200 hours are fully useable. In this paper, we report on these
measurements. We give for the first time calibrated values of the polarization degree, which is of the order of 2 to 3% in average. Its behaviour is confirmed : the polarization decreases when the auroral activity increases. However, the anticorrelation is not one to one, revealing a much more complex mechanism. The angle of polarization is also calibrated. It varies also with the auroral activity, rotating around the magnetic field line.
This set of observations is a new step to understand the thermospheric emission polarizations and make it an useable proxy for future space weather purposes.