



The auroral polarisation: A new measurement technique for monitoring the upper atmosphere

Jean Lilensten (1), Mathieu Barthélemy (1), and Hervé Lamy (2)

(1) CNRS/IPAG, Institute of Planetology and Astrophysics in Grenoble (IPAG), Grenoble cedex 9, France (jean.lilensten@obs.ujf-grenoble.fr), (2) Belgian Institute for Space Aeronomy, Brussels, Belgium

For the last years, we have been discovering the polarisation of the auroral red line both in the cusp (Svalbard) and in the auroral oval (Skibotn). We have proven that its Degree of Linear Polarisation (DoLP) varies accordingly to the geomagnetic activity. In the last 2 winters, two major steps have been achieved, that will be reported in this contribution.

- The first one is the calibrated determination of the Angle of Linear Polarisation (AoLP) during a winter at Ny Alesund (Svalbard). We have shown that it moves along the magnetic field, giving for the first time a way to monitor its configuration at distance. When there is no activity, the AoLP is exactly parallel to the magnetic field.
- With a new instrument, we have been able for the first time to explore the polarisation of the full auroral spectrum in a dedicated campaign in March 2016. We have discovered that not only the 630 nm red line is polarised, but also other oxygen line and ones (neutral and ionized).

These two discoveries open a new window on our space environment. We will show that they provide information both on the thermosphere and on the ionosphere. In the next future, we envision a series of instruments in order to develop the polarisation as a new space weather tool and to establish a bridge between the this –till now - fundamental science and operations.