2nd URSI AT-RASC, Gran Canaria, 28 May – 1 June 2018

First results on reprocessing of AWDANet data

János Lichtenberger*[1,2], Dávid Koronczay [1,2], Csaba Ferencz [1], Péter Steinbach [3], Mark Clilverd [4], Craig Rodger [5] Dmitry Sannikov [6], and Nina Cherneva [6]

(1) Department of Geophysics and Space Sciences, Eötvös University, Budapest, Hungary, lityi@sas.elte.hu
(2) Geodetic and Geophysical Institute, RCAES, Sopron, Hungary,
(3) MTA-ELTE Research Group for Geology, Geophysics and Space Sci., Budapest, Hungary,
(4) British Antarctic Survey, Cambridge, United Kingdom,
(5) Department of Physics, University of Otago, Dunedin, New Zealand,
(6) Institute of Cosmophysical Research and Radio Wave Propagation, Paratunka, Russia

In the PLASMON FP7-Space project (http://plasmon.elte.hu, Lichtenberger et al., 2013, SWSC], a new whistler inversion algorithm [Lichtenberger, 2009, JGR] was implemented using Virtual Trace Transformation [Lichtenberger et al., 2010, JGR]. The Virtual Trace Transformation used in the Automatic Whistler Analyzer algorithm is applied to a cleaned reassigned spectrogram and its applicability highly depends on the effectivity of the spectrogram cleaning step.

Thus the whistler inversion algorithm used to process AWDANet data has been changed from Virtual Trace Transformation to Reduction to Sferic algorithm. The main reason was to overcome the problem of so called 'outlier' points on spectrograms. A new approach has been developed for ground based whistlers based on 'de-chirping' (originally developed to low altitude satellite data [Jacobson et al., 2011, AnnGeo] or 'reduction-to-sferic' method that compensates the signal phase from the time of the recording back to the sferic. The phase calculated for a frequency is based on the whistler inversion algorithm mentioned above. This algorithm works well on data recorded by satellites, but the ground based data recorded by the AWDANet are always contaminated by sferics. There are promising efforts to remove sferics from the raw signal, but they are not yet (and probably never will be) perfect.

Therefore we have swapped back to frequency domain and the Reduction to Sferic algorithm works now on spectrograms. The inversion algorithm has also been enhanced by using IRI 2016 model and be further enhanced with real-time IRTAM data soon to calculate foF2 frequency needed for correction of ionospheric propagation. We have started to reprocess all archive whistler data collected by AWDANet stations since 2002. It it will take long time to complete, thus here we present the first results on reprocessing of whistlers recorded by AWDANet.