

Without the need for GNSS data we have promoted a method which improves the estimate of the averaged difference over many samples between barometric and radar altitude. In tracking air traffic one is not really interested in knowing the precise geometric altitude. It is more important to be able to improve the comparison of data from different sensors, in order to verify tracks and discover non-cooperating targets. Independence of satellite is a bonus.

However, in an operational system for tracking of targets, we would require very dense space and time specific information from AROME Arctic. This information is already present in the AROME Arctic model as is from the Meteorological office, but software should be developed for fast retrieval of data for online processing with airplane targets. Meteorological data from layers closer to sea level should be incorporated in future analysis, which is strongly recommended by [6]. We might also wish to improve the AROME Arctic model by using meteorological measurements such as available data from observed airplanes' meteorological registry, which really may be treated as meteorological measurement stations.

Acknowledgements

We thank Ole Halvard Sætran for excellent formatting and quality checking of PSR and SSR data and Frode Magne Byrkjeland for offering his detailed technical knowledge and advice. Also thanks to Martin Rytir for contributing his knowledge and software for exploiting the AROME Arctic model, and to the Norwegian MET office for access to AROME Arctic.

References

- [1] EUROCONTROL, 'EUROCONTROL Guidelines for Cold Temperature Corrections by ATS', Edition number: 1.0, Edition date: 24.10.2014
- [2] W. B. Sweezy and B. R. Bean, 'Correction of Atmospheric Refraction Errors in Radio Height Finding', Journal of Research of the National Bureau of Standards-D, Radio Propagation, Vol. 67D, No. 2, March-April 1963
- [3] Y. Seity, P. Brousseau, S. Malardel, G. Hello, P. Benard, F. Boutier, C. Lac and V. Masson, 'The AROME-France Convective-Scale Operational Model', Monthly Weather Review, Volume 139, page 976 -991, March 2011
- [4] Otakar Jicha, Pavel Pechac, Vaclav Kvicera and Martin Grabner, 'On the uncertainty of Refractive Height Profile Measurements', IEEE ANTENNAS AND WIRELESS PROPAGATION LETTERS, pages 983 – 986, VOL.10, 2011
- [5] Andrew J. Palmer, Duncan C. Baker, 'A Novel Simple Semi-Empirical Model for the Effective Earth Radius Factor', IEEE TRANSACTIONS ON BROADCASTING, pages 557-565, VOL. 52, NO4, December 2006
- [6] Thomas A. Guinn, Fredrick R. Mosher, 'Numerical Model Derived Altimeter Correction Maps for Non-Standard Atmospheric Temperature and Pressure', International Journal of Aviation, Aeronautics, and Aerospace, Volume 2, Issue 2, Article 4, 2015