UCD Meteorology M.Sc. Research Project 2010

Investigating Valentia Observatory's recent Radiosonde records

Valentia Observatory is the Republic of Ireland's only radiosonde station. In late 2006 the Observatory upgraded its radiosonde infrastructure. This upgrade now allows Valentia to keep more complete digital records of upper air ascents including associated metadata.

Valentia launches four weather balloons a day. Temperature, pressure, relative humidity, wind speed and wind direction are measured using a radiosonde which is attached to a balloon. This meteorological data is transmitted from the radiosonde to a base receiver located at the Observatory. This vertical profile data is of use to weather forecasters, climatologists, numerical weather prediction models and the remote sensing community.

Weather balloons expand as they rise through the atmosphere until they eventually burst and fall back to the ground. From an operational perspective, balloon ascents generally terminate as a result of a burst, but occasionally ascents can terminate due to the loss of signal received by the base station, a *Total Signal Failure* event.

The student will be required to:

- Spend a number of days at Valentia using the local upper air infrastructure to convert archived raw data files (4 a day from 2007 to present) into universal readable ASCII files containing fields of interest.
- Plot a map of Ireland illustrating the location of all bursts. Investigate any seasonality or clustering in burst locations. Determine the percentage of ascents that burst over the sea. Investigate any correlations of burst heights with season or balloon delivery batch.
- Extract from a different file type the reason for termination of each ascent.
- Investigate any correlations between Total Signal Failure with Meteorological conditions (perhaps loss of signal in strong wind or heavy rain?) and geographical location (perhaps shadowing effects caused by nearby mountains?).

Methods and results to be presented in a report.

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