



The Tweeting Ice Shelf: geophysics and outreach

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Over the last decade the Antarctic and Greenland ice sheets have contributed about one third of the annual sea level rise (Hanna et al., 2013). However, it remains difficult to reconcile global mass balance estimates obtained from different satellite-based methods. A typical approach is to balance the mass input from atmospheric modelling with the outgoing mass flux at the ice-sheet boundary (Shepherd et al., 2012). The flux calculations at the boundary rely on satellite-derived surface velocities, which are currently only available as snapshots in time, and which need ground truth for validation. Here, we report on continuous, year-round measurements that aim at improving the input-output method in several aspects and carefully map the flow speed allowing for detecting seasonal variability.

For this purpose, we set up in December 2014 three stand-alone single-frequency GPSes on the Roi Baudouin ice shelf (East Antarctica). The GPSes are installed across a surface depression (typical for large ice-shelf channels), where subglacial melting is expected. This setup allows us to investigate how these channels behave, i.e. if they become wider, whether or not they enhance the ice flow, and, in combination with an installed phase-sensitive radar, what amount of melting occurs below the channels in contact with the ocean.

The GPS data are transmitted on a daily basis. Ice-shelf velocity is derived from the raw hourly location following the methods described in den Ouden et al. (2010), Dunse et al. (2012), and Ahlstrøm et al. (2013). However, a reference station has not been used for the correction. Basic processing involves outliers removal, smoothing, time-series analysis and comparison with tidal models.

The project comes alongside an outreach event: on a weekly basis, the ice shelf 'tweets' its position, motion and relays other information with respect to the project. The GPS systems can be followed on Twitter via @TweetinIceShelf as well as the Tweeting Ice Shelf's blog (<http://tweetiniceshelf.blogspot.com>).