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| **Title: Improving woodland clearing and regrowth detection using imaging radar** |
| **Introduction/Aim:** Global, long-term data sets from optical satellite sensors, e.g. Landsat and Sentinel-2 series, are primarily used to detect and produce annual clearing and regrowth maps for Queensland, Australia. These products are used for statewide programs including conservation and bushfire mapping, Reef Water Quality Protection, and compliance assessment, as well as contributing to international reporting requirements on carbon and the recent European Union Deforestation Regulation.  Queensland is known for its high rates of deforestation and imaging radar offers potential for improving detection and accuracy of both clearing events and regrowth. Imaging Radar is already being used in several disturbance warning systems in tropical forests, but has been used to a lesser extent in spatially heterogenous woodlands.  **Methods:** A combination of optical (Sentinel-2) and radar imagery (Sentinel-1) was used to explore the distribution and extent of clearing and regrowth in different vegetation communities. The work was conducted in a woodland, sub-tropical savanna environment as part of the Injune Landscape Collaborative Project test site. After identifying backscatter signatures associated with clearing and regrowth, deep learning models were explored to determine which offers the most improvement over the current Landsat/Sentinel-2 methodology. Mapping results from L-band ALOS PALSAR data were also compared with the C-band Sentinel-1 results to assess how effective each radar band (L versus C) was.  **Results:** Backscatter signatures associated with clearing and regrowth were identified in the different vegetation communities. Work is now underway to develop a deep learning approach using the optical and radar imagery to detect clearing over larger areas on a repeated basis. This will be done through publicly available python scripts to automate ingestion and pre-processing of radar imagery to map clearing and regrowth products.  **Conclusion:** This work presented a preliminary demonstration of the abilities of globally available, and regularly updated, radar data sets to detect vegetation clearing and regrowth in a sub-tropical woodland savanna environment. Further work is required to determine how to scale this to work in other non-savanna vegetation communities, on a regular basis. |