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Assessing the continuity of englacial layers across the Lambert Glacier catchment.

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The analysis of englacial layers using ice penetrating radar enables the characterisation and reconstruction of current and past ice sheet flow. To date, little research has been undertaken on the ice flow and englacial stratigraphy of the upper catchment of the Lambert Glacier. The Lambert Glacier catchment is one of the largest in East Antarctica, discharging ~16% of East Antarctica's ice. Quantitative analysis of the continuity of englacial stratigraphy and ice flow has the potential to provide insight into the present-day and past flow regimes of the upper catchment of Lambert Glacier. Radar data from the British Antarctic Survey Antarctica's Gamburtsev Province Project North (AGAP-N) aerogeophysical survey was analysed using the Internal Layer Continuity Index (ILCI). This approach identified, and characterised, a range of englacial structures and stratigraphy, including buckled layers in areas of increased ice velocity (>20ma^{-1}) and continuous layering across subglacial highlands with low ice velocity adjacent to the central Lambert Glacier trunk. Overall, the analysis is consistent with the present-day ice-flow velocity field and long-term stability of ice flow across the Lambert catchment. However, disrupted layer geometry at the onset of the Lambert Glacier suggests a past shift in the position of the onset of ice flow. These results have implications for the future evolution of this major ice flow catchment, and East Antarctica, under a changing climate. The ILCI method represents a valuable tool for rapidly characterising englacial stratigraphy, and the study demonstrates the transferability of the method across Antarctica. The use of quantitative tools such as ILCI for the analysis of large radar datasets will be critical for projects such as AntArchitecture (https://www.scar.org/science/antarchitecture/home/) which aims to investigate the long-term stability of the Antarctic ice sheets directly from the internal architecture of the ice sheet.