Ice Sheets and Future Shorelines: The Necessary Geodetic Revolution

Matt King (Australia)

SUMMARY

Every centimetre of extra sea-level brings approximately 1 million additional people globally into the zone impacted by the sea. Understanding future coastal sea levels requires a close examination of the change in the great ice sheets of Antarctica and Greenland, as well as vertical land motion around the coast. Both are not well known, but geospatial and geodetic observations provide critical insights into how the ice sheets are changing and offer the most accurate means to quantify vertical land motion.

This presentation will explore how satellite geodetic data are increasingly able to define ice sheet changes and how these data, now of sufficient duration and robustness, can quite reliably be used for projections over the coming decades. At the coast, a combination of expanding GNSS networks and a revolution in synthetic aperture radar data coverage promises sub-millimeter-per-year accuracy with quasi-continuous spatial coverage at a continental scale, revealing previously unobserved subsidence and uplift. Together, these advancements place geospatial and geodetic knowledge at the heart of future projections and adaptation planning. However, this progress hinges on universities, governments, and industry addressing a shortage of expertise in these areas.