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Precursors and processes culminating in the Anak Krakatau December 2018 sector collapse and tsunami

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It is 135 years after the 1883 volcano-triggered tsunami disaster, when Krakatau volcano became once more the source of a deadly tsunami striking without warning. We use data recorded on the ground and by satellite, to show that the volcano was in an elevated stage of activity throughout the year 2018, producing thermal anomalies associated with volcanic deposits, an increase of the island area and ground movement of the south-western sector of the island towards the sea, increasing in June 2018. Following further intense activity on 22 December 2018, seismic data reveal the timing and duration when this sector collapsed. The landslide removed 102 million m^3 of material subaerially, which was followed by ~15 minutes of phreatic explosions. This study allows better understanding of the complex hazard cascades, including precursory thermal anomalies, island growth and deformation, followed by sector collapse, tsunami waves, and finally explosive volcanic eruptions, and has important implications for designing early warning systems.

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