

## **Mapping Aoraki / Mt. Cook, New Zealand - Remote presentation (from New Zealand)**

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In 1882, Rev. W. S. Green and his climbing party were the first to come near the summit of Aoraki/Mt Cook, the highest peak of New Zealand. Based on a barometric measurement taken just before being forced by the weather to turn back, Green (Green, 1883, pg. 250-251) estimated that they reached 3755 m (12,319 ft). This was only 9 m (30 ft) from the summit height of 3,764 m established the previous year by surveyor George J. Roberts and that remained the official height of Aoraki/Mt Cook until 14 December 1991, when a massive rock avalanche roared down the East Face (Chinn et al., 1992). Department of Survey & Land Information (now LINZ) reassessed the height of the summit by using photogrammetry on the basis of aerial stereo photos captured shortly after the event (Hannah, 2013). A new official height of 3754 m was estimated and new topographic contours were derived for the affected area.

As an outcome of recent photogrammetric processing of a set of aerial photographs captured in February 2008 (Vivero et al., 2012), it was observed that the height and location of the highest point of New Zealand departed from the official record by a substantial amount. This provided the rationale and motivation to conduct a new survey of New Zealand's highest mountain. In order to observe the sacred status of Aoraki to the indigenous Maori tribes of Ngāi Tahu, a combination of photogrammetry and precise GPS measurements near the summit was used.

A further aspect of the project involved a "tribute" trigonometric survey using a Wild T3000 precision theodolite that reproduced some of the complexities that the early surveyors encountered when estimating the height of mountains. Nonetheless, this traditional surveying approach also took advantage of new technologies such as Geographical Information Sciences (GIS) and geo-visualisation to facilitate the identification of appropriate viewing points, while placing the latest findings within New Zealand's rich history of surveying. This paper reports on the combination of these three surveying techniques to establish the current position and height of this prominent landmark, while observing its cultural value.

### *Related websites:*

<http://www.otago.ac.nz/surveying/research/geodetic/otago061558.html>

<http://www.livescience.com/42610-new-zealand-aoraki-mount-cook-shrinks.html>