New hidden continent mostly underwater, scientists say - 17/02/2017

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New Zealand is not just a few small islands at the bottom of the world. It is actually part of a fairly large continent 94% of which is under the sea.

This is the conclusion of a paper published this week in GSA Today, the journal of the Geological Society of America.

Lead author Dr Nick Mortimer of GNS Science – 'this paper will be a genuine surprise to many European, Asian, American, African and Australian geologists'. Photo – Margaret Low, GNS Science.

Eight GNS Science geologists, along with colleagues from Victoria University, the Geological Survey of New Caledonia, and the University of Sydney summarise the evidence that 4.9 million square kilometres of the South West Pacific Ocean is underlain by a submerged continent.

This will not be a surprise to many New Zealand geoscientists, as GNS Science staff and colleagues have long been building the case for Zealandia and it has already been the subject of many books and presentations.

Lead author Nick Mortimer of GNS Science said this latest publication was significant in that it described the results of more than 20 years geology and geophysics research in a summary paper that is fully referenced and peer-reviewed.

"Being more than 1 million square kilometers in area, and bounded by well-defined geologic and geographic limits, Zealandia is, by our definition, large enough to be termed a continent," Dr Mortimer said.

It is large and separate enough to be considered an actual continent.

Zealandia has a continental crust thickness between 10km and 30km, and increasing to more than 40km under parts of the South Island.

"Based on various lines of geological and geophysical evidence, particularly those accumulated in the last two decades, we argue that Zealandia is not a collection of partly submerged continental fragments but is a coherent 4.9 square million kilometre continent.

"Currently used conventions and definitions of continental crust, continents, and microcontinents require no modification to accommodate Zealandia."

As well as being the seventh largest geological continent, Zealandia is the youngest, thinnest and most submerged.

Dr Nick Mortimer

Zealandia is six times bigger than Madagascar, and about the same area as greater India.

"As well as being the seventh largest geological continent, Zealandia is the youngest, thinnest and most submerged.

"Zealandia provides a fresh context in which to investigate processes of continental rifting, thinning, and breakup."

The name Zealandia was first proposed by geophysicist Bruce Luyendyk in 1995 as a collective name for New Zealand, the Chatham Rise, Campbell Plateau, and Lord Howe Rise.

Zealandia illustrates that the large and obvious in natural science can be overlooked. Dr Mortimer said the authors hoped the new paper would be the 'go to' scientific reference on Zealandia for many years to come.

GSA Today has a global audience, and the presence of an extra continent on a map of the Earth will be a genuine surprise to many European, Asian, American, African and Australian geologists. GSA Today publishes 12 science articles per year.

The paper is called Zealandia: Earth's Hidden Continent.

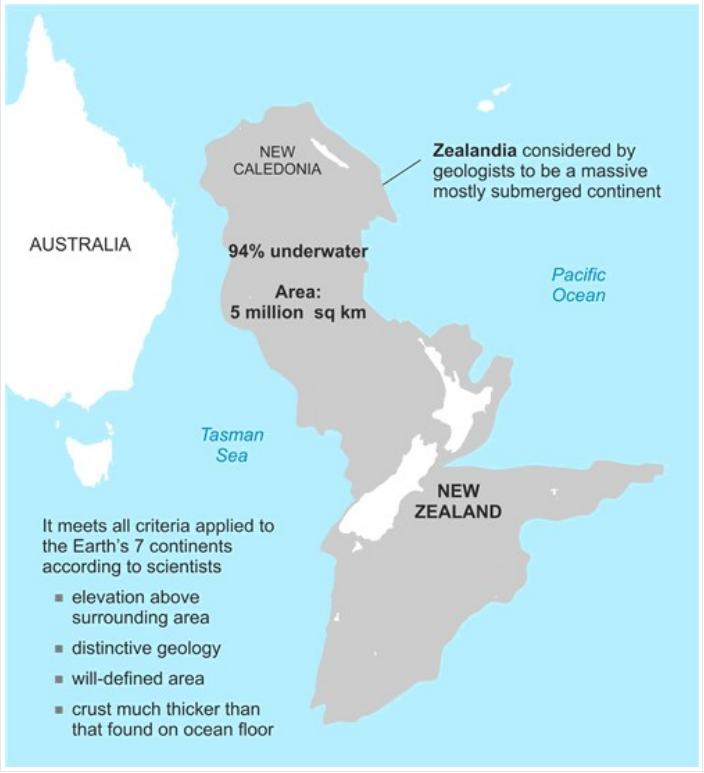
In summary

Zealandia is the world's smallest and most submerged continent. Evidence for this has been building over many decades, but a recently published GSA

Today paper is a benchmark. It is the first time all the various kinds of data and the defining features and limits of Zealandia have been described in a single scientific paper. The case is made that Zealandia is not just continental, but a continent.

Key points:

- 4.9 Mkm2 area
- 94% submerged (wide continental shelves)
- Highest point Aoraki-Mt Cook 3724m
- Two tectonic plates (Pacific, Australian)
- Was once part of the Gondwana supercontinent



Of the eleven authors on the paper, nine are from GNS Science. This reflects the convergence of many strands of long term and ongoing research projects and 'joining the dots' by staff in GNS Science's Regional Geology, Marine Geoscience, and Petroleum Geoscience departments. Especially influential have been the QMAP 1:250 000 national mapping programme, and research into New Zealand's basement terranes and batholiths, the marine geology of the Tasman Frontier region between New Zealand and New Caledonia, the Chatham Islands, and New Zealand's offshore sedimentary basins.

International colleagues have played an invaluable role in exploring and defining Zealandia. Collaborative voyages on the research vessels Tangaroa, Sonne, l'Atalante, Southern Surveyor and Investigator have probed Zealandia's crust and retrieved essential continental rock samples.

The open access paper can be downloaded from
http://www.geosociety.org/gsatoday/archive/27/3/abstract/GSATG321A.1.htm