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# PROPOSAL FOR REDEFINING "CALDERA" IN GEBCO BATHYMETRIC PUBLICATION No. 6

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## Introduction

In 2008 Dr Yasuhiko Ohara presented an analysis of generic terms used in undersea feature names (SCUFN21-04.2A). Dr Ohara identified several issues relating to the use of generic terms, including the definition for CALDERA in Bathymetric Publication No. 6 (Guidelines Proposal form Terminology) that could be improved. In this document we propose a new definition for the generic term CALDERA to be adopted for Publication No. 6.

## Background

Currently the Bathymetric Publication No. 6 (Guidelines Proposal form Terminology) lists the definition of Caldera as:
A collapsed or partially-collapsed SEAMOUNT, commonly of annular shape

And the definition of seamount is listed as:
A discrete (or group of) large isolated elevation(s), greater than 1,000m in relief above the seafloor, characteristically of conical form.

The Concise Oxford Dictionary of Earth Sciences defines calderas as roughly circular topographic and structural depressions, varying in diameter from 1 to 100 km, and formed by the foundering and collapse of a magma chamber roof into its underlying magma body (e.g. Crater Lake, Oregon, formed by volcanic eruption about 6000 years ago). Caldera collapse is commonly preceded or accompanied by rapid explosive evacuation of magma from the chamber (volcanic eruption). This leaves the chamber roof unsupported by magma pressure and collapse follows. Slumping and erosion of the caldera walls may enlarge the topographic rim of the depression well beyond the structural rim. Later injection of magma into the chamber can cause doming of the caldera floor and formation of volcanic domes (see figures).

Undersea the process for formation of calderas is similar to onshore, and the range of dimensions are similar. Seamounts and peaks are often associated with calderas but calderas are not always associated with seamounts. Consequently the SCUFN definition of "a collapsed or partially-collapsed seamount" is not strictly correct.

## Proposal

We propose a new definition for caldera in Bathymetric Publication No. 6 that does not include the term seamount.

CALDERA – A roughly circular cauldron like depression characterised by steep sides and formed by collapse or partial collapse during or following a volcanic eruption.

## Reference

SCUFN21-04.2A, A springboard for discussion on B-6 terminology section revision by Yasuhiko Ohara, March 21, 2008. http://www.iho-ohi.net/mtg_docs/com_wg/SCUFN/SCUFN21/SCUFN21-04.2A_B-

6_WG_Terminology.pdf.

Crater Lake Oregon, (courtesy of Wikipedia)

Lake Taupo fills a large caldera (GNS Science)