PRESS RELEASE Ref no. WILEY_3

For immediate release: xx Month Year

Tiny Zircons rewrite the history of Ancient Ocean Floor

Geochemical, geochronological and whole rock isotope data reveal new petrogenesis of Silurian age Pillow basalts of the Mayilashan formation

(Tokyo, XX Month)

Science is about the march of progress. New data constantly rewrites old interpretations, and in geology this can change millions of years of history with a single, tiny rock. A research team from Chang'an University, China, headed by Dr. Gaoxue Yang, studied basalts from the Central Asian Orogenic Belt (CAOB), and their findings, published in the *Geological Journal*, have given cause to rethink the current views on the geological history of the CAOB formed by earlier researchers.

The CAOB is one of the largest orogenic collages (linked mountain ranges). It was created by seafloor spreading, with many of the rocks originating in the Paleo-Asian ocean before rising to form the continent and mountains. Earlier studies have demonstrated near continuous volcanism between the Neoproterozoic and Mesozoic eras, but with a gap in volcanism between the early and late Paleozoic.

Seamounts are typical volcanoes forming on oceanic crust due to deep, isolated magma reservoirs breaking through the surface. There are over 125,000 seamounts on the ocean floor, some forming volcanic islands like Hawaii. Whether such seamounts existed in ancient oceans is not explored. To clarify this, Dr. Yang and his team took samples from the pillow basalts in the Mayilashan formation located in West Junggar, in the southwest of the CAOB. They hoped, Dr. Yang states, that "the results will aid in assessing their source and petrogenesis and attempt to determine the late Early Paleozoic evolution of West Junggar".

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Modern pillow basalts are volcanic rocks created when lava erupts underwater, cooling into round, pillow shaped lumps. The research team performed geochemical tests and microscopic imaging on their samples and proved that these rocks formed the same way their modern counterparts do, as a result of seamounts.

Next, the researchers tested the age of basalts by studying zircons in the samples. Because of their resistance to change and impermeable surface, zircons act as tiny time capsules, and are ideal for uranium/lead dating. The researchers found that the zircons in their samples were created in an eruption between 450 and 439.4 million years ago, during the Silurian era in the late early Paleozoic, directly where earlier researchers had said there was a volcanic hiatus. With their new results, Dr. Yang declares, "Combined with the previous literature about oceanic islands, seamounts and plateaus in the CAOB, we infer that a larger number (than previously established) of seamounts with different ages occurred in the Paleo-Asian Ocean."

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As a result, what began as a simple study mapping ancient seamounts resulted in a challenge to the established volcanic history of the region. Science can be like that; many great discoveries have been unearthed when scientists are looking for something different, and the clues to huge volcanoes can be hidden away in tiny zircons.

Reference

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Title of original paper: Petrogenesis of pillow basalts in West Junggar, NW China: Constraints from geochronology, geochemistry, and Sr-Nd-Pb isotopes

Journal: *Geological Journal*

DOI: *10.1002/gj.3078*

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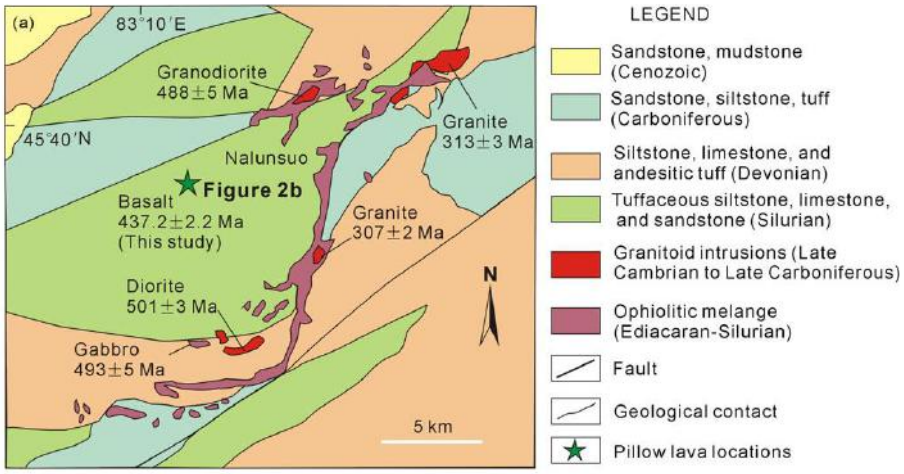

Figure 1. Geological composition of the Central Asian Orogenic Belt

Simplified tectonic sketch of the Nalunsuo area in West Junggar of the Central Asian Orogenic Belt.

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