



**Association for Women Geoscientists-
ConocoPhillips Distinguished Lecture**

**Subduction, Seismicity, and Serpentinization: Capturing
a Subduction Event**

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The dehydration of subducted lithosphere along the Izu-Bonin-Mariana convergent margin system of the western Pacific prompts metamorphic reactions along the decollement and within the overriding plate's mantle. Evidence for metamorphism of the slab and the forearc mantle has come from samples recovered by deep ocean drilling, coring, dredging, and submersible observations and sampling over the past two decades. The presence of serpentinite can explain low velocities observed above the slab in seismic experiments. The formation of huge serpentinite mud volcanoes on the forearc that also bring up slab-derived blueschist-facies metabasites confirm the presence of serpentinite at decollement depths. There is significant evidence now that shows these seamounts erupt episodically and produce muds with highly variable fluid and/or gas (methane) content. Some of these serpentinite mud volcanoes are associated with clusters of earthquakes. The episodic eruptions of the mud volcanoes suggest that there may be a link between seismicity and dehydration events within the decollement. If earthquakes trigger dehydration events (as has been demonstrated for terrestrial sedimentary basins), it may be possible to take the pulse of subduction in such environments. What this would require is monitoring of the seismic activity in the region of a mud volcano and deploying instruments to monitor the temperature and pressure variations, pore fluid compositional and flux variations, and the microbial activity within the conduit regions of the mud volcanoes.