



Department of Geology Seminar Series Presents

Dr. Georgia Pe-Piper

Professor Emerita
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Saint Mary's University

*The Early Miocene volcanic history of Lesvos island,
Greece: shoshonites, ignimbrites and the petrified forest*

WEDNESDAY, NOVEMBER 6 - 11:30am

Science 411

Everyone is welcome to attend!



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Dr. Georgia Pe-Piper, Professor Emerita, Department of Geology, Saint Mary's University

Title: *The Early Miocene volcanic history of Lesvos island, Greece: shoshonites, ignimbrites and the petrified forest*

Abstract

The island of Lesvos, in the northeastern Aegean Sea, has early Miocene volcanism that is representative of a regional shoshonitic (K-rich trachyandesite) volcanic province. Volcanic activity resulted from slab detachment and asthenospheric upwelling following closure of the Pindos Ocean in the Paleogene. A chain of stratovolcanoes, with several caldera, extends NNE-SSW across central Lesvos, with pyroclastic flow tuffs onlapping basement both to the SE and NW. The oldest volcanic rocks are ~21 Ma andesitic domes of the Eressos Formation. These are overlain by several hundred metres of Sigri Pyroclastic Formation comprising pyroclastic flow tuffs (unwelded ignimbrites) interbedded with fluvial conglomerate and volcanoclastic sandstone. Hundreds of petrified trees are entombed in the tuffs. The orientation of fallen tree trunks indicates NW to N movement of pyroclastic flows, implying a source to the south near the younger Tavari caldera, which formed during the eruption of the 25 m thick welded Antissa ignimbrite. Rapid burial by permeable tuffs, silica from alteration of volcanic ash, and later hydrothermal circulation driven by enhanced volcanic activity all contributed to the preservation of the petrified trees. Following the Sigri Pyroclastic Formation at ca. 18 Ma, a rapid increase in the pace of volcanic activity produced thick lava sequences in the central stratovolcanoes, deposited of several thick welded ignimbrites (30–50 m thick) to the east, and dykes and laccoliths were intruded in SW Lesvos with inversion of the Sigri basin. Ignimbrite flow directions show that at least two more calderas were formed by the ultra-Plinian eruptions. Minor basalt and andesite flows and dykes in SW Lesvos include primitive lamproites that provide information on the mantle melts that triggered the volcanic activity. By 16.5 Ma, volcanic activity had ended, and the modern tectonic regime has dissected the volcanic rocks along E-W trending graben.