2010 Distinguished Geologic Career Award (MGPV Division)

Presented to Peter Lipman

Citation by Olivier Bachmann

Peter Lipman is the first recipient of the GSA MGPV Career Achievement award. This is richly deserved and a great start for this award. Pete's pioneering and innovative work on large volcanic systems, should it be silicic caldera-forming eruptions or giant shield volcanoes, set the tone for much of the work that has been done over the past half century, and this award is allowing us to pause and reflect on how much we owe to Pete for all this hard work.

Pete's career started at a most exciting time for a geologist. Pete was finishing his Ph.D. at Stanford when Harry Hess's published his landmark paper on sea-floor spreading, setting up the stage for the plate tectonics theory to puzzle the earth science community. And it was also just as several seminal papers by Bob Smith on ash flows appeared, which were break-through explorations of processes at large caldera-forming explosive eruptions (now commonly referred to as "supervolcanoes") on our planet. As a fresh "Doc in rocks", Pete started working at the Nevada Test Site, only to realize that this place was covered with giant ash-flow deposits that meshed wonderfully with Smith's interpretations. Then, in order to obtain better perspectives on younger units, he managed to spend a year in Japan as an NSF post-doctoral fellow, to study one of the largest Quaternary caldera-forming eruptions, the Aso Tuff. Japan during 1964-65 must have been a great adventure for a couple of young westerners (his wife Beverly was with him for the whole time), and it left great memories and influences, with Japanese art and life-style hints still surrounding their lives many decades later.

Studying the gigantic ash-flow units in Nevada and Japan led Pete to one of his first major discoveries: that many of these deposits came out of the ground strongly zoned in composition and mineralogy. Both the Aso system and the Nevada Test Site units show obvious signs of being erupted from complex magma reservoirs in the shallow crust, and understanding how and why these reservoirs behave this way has kept a lot of us igneous petrologists and volcanologists busy for the last 50 years.

Pete's volcano studies moved east in 1965 and landed in a wonderful land of opportunity, Colorado(!), and more specifically the San Juan region (now recognized as the largest erosional remnant of the composite Southern Rocky Mountain Volcanic Field). With his usual efficiency, Pete started field work in the San Juan as soon as the jet lag was over, two weeks after moving back from Japan. By 1968, as French hippies were swarming the street of Paris, Pete and his colleagues were swarming all over southern Colorado in a whirlwind of mapping that has not stopped, as he was in the Colorado mountains until a few weeks ago to continue fieldwork. By a complex

combination of intense mapping, advanced petrology, geochronology, and geophysical techniques, Pete and colleagues realized the southern Colorado had been a Tertiary hot plate, with almost 30 large caldera-forming ignimbrites erupted in a few million years during what is called now the western USA magmatic flare-up. Their careful unraveling of the magmatic history of this region took many years, enormous energy, creative thinking, and the most state-of-the-art techniques in geochemistry (including early isotopic determinations in the mid seventies), but I believe that Pete has laid out for us in incredible detail one of the best examples of a continental-arc magmatic province. I can't resist noting that it also contains the only magnitude-9 eruption documented on our planet (based on Mason et al. 2004). We actually don't know if this unit, the Fish Canyon Tuff, which Pete and my other mentor Mike Dungan allowed me to look at, is really the largest ignimbrite on Earth, but being in the USA and largely put on the map by Pete, it probably ought to be.

Each large magmatic province has its advantages, but the one that stands out in the SRMVF is the intermediate degree of erosion and the great amount of topographic relief (hard on the legs and lungs but scientifically advantageous). It allowed Pete to see calderas structures like few places on Earth. The great dissection by glacial valleys exposes ring faults, densely welded intracaldera facies, resurgent domes, and tops of the plutonic roots of these caldera cycles. This led to the discovery of "megabreccias" near walls of the calderas, a major advance in understanding the geometries and construction of these structures. It also allowed Pete and field geologists in other areas of the world to avoid becoming totally bewildered by Nature's tricks while mapping. Caldera landslide breccias can expose all kinds of lithologies, cropping out with unexpected attitudes and in places where they shouldn't be. Without the mental framework that km-sized blocks can slide, rotate and land kilometers away from where they started, a field geologist can rapidly go totally crazy.

After about a decade of working in southern Colorado, I can only assume that Pete got slightly tired of being stormed upon and chased by lightning every summer and decided to get involved in studying volcanoes under balmier skies. His first work on Kilauea and Mauna Loa appeared in the late 1970's, and Pete has been back there for many decades, mapping the subaerial and submarine flanks of these fabulous volcanoes with colleagues from all over the world, including Japanese ships and submersibles that would take them to sea-floor depths to observe the gigantic landslides that take away from time to time the flanks of the Hawaiian volcanoes. He also had the good taste of acquiring a share in a wonderful house on the sunny side of Big Island, a delightful idea for some of us, who are just a short flight away from this tropical paradise.

I was fortunate to join Pete in the mid-1990s for a series of epic summers in the SRMVF to continue unraveling the histories of these supervolcanoes. Pete has been a fabulous mentor to me (and to many others young volcanophiles), not only with respect to his approach to science but also his approach to living. Volcanoes, although clearly a big part of his life, are balanced with his great family and interests far from erupting mountains. Probably few of you know that Pete is a great art enthusiast (he was the president of the San Jose Museum of Art for several years), wine aficionado (he has

one of the most amazing wine collections that I know), a world connoisseur (he loves to travel), and one of the few volcanologists who walks faster than his shadow. Pete, I want to thank you for allowing me to be here today, for everything you have done for our science, and congratulate you again heartily for this richly deserved award.

References:

Mason BG, Pyle DM, Oppenheimer C (2004) The size and frequency of the largest explosive eruptions on Earth. Bulletin of Volcanology 66:735-748