

All are invited to attend the monthly meeting of the
Nittany Mineralogical Society
Wednesday, February 20, 2013

Parents/guardians must provide supervision of minors.

Are the Exotic Minerals in Carbonatites Evidence for Upper Mantle Pegmatite Analogues?

by Dr. David (Duff) Gold
Emeritus Professor of Geology
The Pennsylvania State University

Our February meeting will be held Wednesday the 20th in room 119 Earth & Engineering Sciences Building on the west side of the Penn State campus in State College, PA. Maps are available through our web site.

– NO JUNIORROCKHOUNDS MEETING THIS MONTH –

6:30 to 7:30 p.m.: Social hour, refreshments in the lobby

7:30 to 8:00 p.m.: announcements, questions, answers; door prize drawings

about 8:00 p.m.: featured program

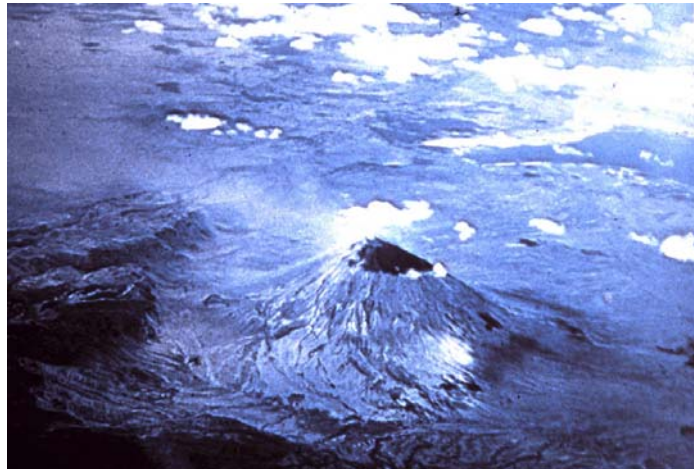
The event has free admission, free parking, and free refreshments, and is open to all (Parents/guardians must provide supervision of minors) –

Bring your friends and share an interesting evening.

In addition to the dominant carbonate minerals, common minor minerals include sodian augite, sodian richterite, biotite and vermiculite, magnetite, apatite, monticellite, melilite, melanite and kinseyite (Zr garnet), nepheline, and accessory pyrochlore, bastnaesite, badleyite, fluorite, barite, strontonite, monazite, niocalite, lueshite, perovskite, la trappite, titanite, zirconolite, ancylite, synchisite, parisite and xenotime. Some biotites are enriched in barium and some garnets are zirconium rich. Most of the apatites are enriched in rare earth elements and a discrete thorium phosphate (britholite) has been found at the Oka Carbonatite in Quebec. Phalaborwa, in South Africa contains sufficient copper (bornite, chalcopyrite and chalcocite and vallerite) to mine. Alteration products include serpentine, celadonite and wairakite. A zone of supergene enrichment in carbonatites weathering under tropical conditions may contain fersmite, brockite, rhabdophane, churchite, gorceixite, goyazite, florescite, anatase, ferranite, hewrttite, montroseite and navajoite as potential ore minerals.

Except for lithium they share a geochemical signature for an enrichment of the fugitive elements Ba, Sr, Ti, P, RE, Nb, Ta, Th, Zr with granitic pegmatites. These elements accumulate in late fractionating melts in magmas because their anomalous charge and/or ionic radius renders them unsuited by geometry or charge to fit well into the common silicate minerals. Other evidence includes the presence of large crystals of calcite with quench and spinifex textures, and a strontium and neodymium isotopic signature close to that of bulk earth.

Carbonatites are rare deep-seated volcanic edifices that tend to be associated with rift settings on continental cratons. They are the main repositories of the Space Age High Tech (SAHT) elements (super magnets, cell phone and electronic components), the high temperature-high strength niobium steel (used in jet engine turbine blades and the skin for space rockets and vehicles, and pipe-lines), as well as some industrial minerals (vermiculite, and phoscorite fertilizers).



Mt Oldonyo Lengai, an active natro-carbonatite volcano in Tanzania.

See the February NMS Bulletin for the complete, illustrated article.

www.nittanymineral.org