Mineralogy of Palagonitic Material from the Golan Heights, Israel

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Abstract: Sideromelane in Pleistocene lapilli-tuff rocks from the Golan Heights had partly altered into palagonite. X-ray and electron diffraction showed that the major part of the clay alteration product is composed of a dioctahedral micaceous mineral with well organized crystallinity along the *a*- and *b*-axes. Very poor basal reflections as well as incomplete expansion upon glycerolation and incomplete collapse upon heating were interpreted as being due to random interstratification with chlorite. Electron microscopy showed the particles to be very similar to montmorillonite tactoids. The thermal behavior as well as surface properties were similar to those of montmorillonite. Differential dissolution analysis and infrared spectroscopy failed to indicate amorphous constituents to any significant extent. Chemically the material was enriched in iron, aluminum and titanium and depleted in alkali and alkaline earth cations.

A minor component of the clay was found to consist of ‘ onion-like ’ halloysite. It is suggested that palagonite is a natural precursor for montmorillonite in the volcanic glass-montmorillonite alteration series.

Clays and Clay Minerals; June 1974 v. 22; no. 3; p. 231-240; DOI: 10.1346/CCMN.1974.0220305

Clay Minerals Society (www.clays.org)