Appendix 02. Descriptions of Miocene-Pleistocene stratigraphic units pre-dating and post-dating the Sandlin unit

Miocene deposits pre-dating the Sandlin unit

Ojo Caliente Sandstone, Tesuque Formation

The tan-colored, cross-stratified, well-sorted, and relatively clean eolianite sand of the Ojo Caliente Sandstone makes it one of the more distinctive members of the Tesuque Formation (Fig. A2-01, panel A). In the study area, the sand is very pale brown (10YR 7/3-8/2) and occurs in cross-stratification sets as much as 5 m-thick. The individual foresets are laminated to very thin, and locally alternate, in a rhythmatic fashion, between coarser sand and finer sand. Sand grains are generally fine- to medium-grained, subangular to rounded (mostly subrounded), well sorted, and composed of quartz with 15-18% orange-stained quartz and possible potassium feldspar, 1-5% felsic to intermediate volcanic grains and chert, and 3-5% mafic grains. Although locally strongly cemented in its lower part, in the study area the sand is moderately consolidated and only weakly cemented. A cross-section suggests a maximum thickness of 200-250 m (Koning et al., 2007).

Vallito Member, Chamita Formation

The Vallito Member is distinguished from the Ojo Caliente Sandstone by the lack of thick cross-stratification and the presence of very coarse sand grains and 1-5% pebbles (Fig. A2-01, panels B through D). It differs from the overlying Sandlin unit by its paucity of gravel. Where exposed, the contact between the Vallito Member and the Sandlin unit is a scoured or planar disconformity (Fig. A2-01. panel B). Sand colors are slightly browner or redder than the Ojo Caliente Sandstone, ranging from very pale brown or light yellowish brown (10YR 7/3-6/4) to light brown or reddish yellow (7.5YR 6/4-6). The Vallito Member is dominated by sand that is massive or else in medium to thick, tabular to broadly lenticular beds that are internally laminated. The sand is relatively similar in composition and texture to the Ojo Caliente sandstone, but generally less clean and less sorted. The sand is fine- to very coarse-grained (mostly fine- to medium-grained), subangular to rounded (mostly subrounded), moderately to well sorted, and composed of quartz, 15-20% orange-stained quartz and possible potassium feldspar, 5-15% mafic grains, 3-10% felsic to intermediate volcanic grains, and trace to 1% green quartz grains and probable Paleozoic sedimentary fragments. Clay, silt, or very fine-grained sand are sparse (estimated to be 1-5% of total volume). Locally, very fine to medium pebbles are observed that are scattered or locally in very thin lenses. These pebbly zones are interpreted to comprise <7% of the total sediment volume and the clasts are subrounded and moderately sorted. The pebbles are composed of rhyolite, felsic tuff, welded felsic tuff, greenish Paleozoic sedimentary clasts, dacite, quartzite, and granite (most to least abundant). Trace basalt pebbles are seen under the south Comanche Rim basalt flow, but whether they are reworked from the Hindsdale Formation or older Servilleta basalt flows is unclear. This member is mostly weakly to moderately consolidated and non-cemented. Based on map relations, the Vallito Member is 5-21 m-thick.

Plio-Pleistoene deposits post-dating the Sandlin unit

Sand and minor sandy pebbles that overlie Servilleta Basalt flows and the Sandlin unit (unit QTae)

On the Taos Plateau in the study area, sandy sediment overlies Servilleta basalt flows and the Sandlin unit. This sediment has minor pebbly beds composed of felsic volcanic rocks. We have not found exposures of the basal contact. This unit is differentiated from the underlying Sandlin unit mainly by its sandy texture and gravel composition. Limited exposures of the upper part of this unit exhibit massive sand that is reddish yellow to light brown (7.5YR 6/4-6) to very pale brown (10YR 7/3-4). The sand is fine- to medium-grained, subrounded to well-rounded, well-sorted, and similar to the Ojo Caliente Sandstone Member (Tesuque Formation) in composition. Sandy pebbles are commonly in thin to medium, lenticular beds. Pebbles are subrounded, moderately sorted, and composed of rhyolite and felsic tuffs (including welded tuffs). There are minor beds of strong brown (7.5YR 5/6), fine- to medium-grained sand with 0.5% clay. Post-basalt alluvium is not exposed in the southeastern map area but float here contains some Pilar phyllite and more quartzite (?) than to the north. The gravel composition suggests deposition by south-flowing streams reworking the Sandlin unit, Plio-Pleistocene eolian sediment, as well as Los Pinos Formation on the western margin of the San Luis Basin. Non-reworked eolian strata may be present. Total thickness is uncertain, but we infer < 10 m.

Figure A2-01

Figure A2-01. Photographs of Miocene deposits underlying the Sandlin unit. A) Cross-stratified Ojo Caliente Sandstone, as observed near the exposure of the gravel underlying the 5.54 ± 0.38 Ma basalt (Fig. 7). B) Arrows demarcate the sharp, relatively planar contact between the Vallito Member (Chamita Formation) and the underlying Ojo Caliente Sandstone (Tesuque Formation) at the base of the Middle Cerro Azul stratigraphic section. C) The Vallito Member (Chamita Formation) exhibits 10-30 cm-thick, tabular beds, as observed here at the base of the Middle Cerro Azul stratigraphic section. D) Close-up of the Vallito Member depicted in C. The Vallito Member generally consists of sand, but locally there are very fine to fine pebbles, as observed here. Clasts include rhyolite, felsic tuff, welded felsic tuff, greenish Paleozoic sedimentary clasts, dacite, quartzite, and granite (most to least abundant). Pen for scale.