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Petrologic Characteristics Of Building Material Of Georgia's Cultural Heritage Monuments And Historic Quarry Identification

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Rocks used as construction material represents an essentially important component of mined resources thus many researches have been implemented worldwide for locating sites rich with such material, to which Georgia is no exception. On the other hand there is a less studied specific context of the abovementioned resource: building rocks in historic perspective. During last several years preservation and restoration of various monuments of cultural heritage have been swiftly gaining actuality in the country.

As Georgian historic sources seldom mention whereabouts of the quarries used for obtaining such construction material, geologic analysis of rock blocks of cultural heritage monuments is essential not only for structure conservation purposes but also for tracking and locating outcrops of identical rocks (supposed historic quarries) where new material can be obtained for future restoration of these monuments.

Applied methodology consists of analysis of petrology of the monuments of interests (Identification of different geologic material used for construction, recovery of specimens of used rocks of each type per monument, visual specimen inspection, Schmidt rebound hammer test, optical mineralogy analysis, XRF analysis), identification of supposed quarry areas on existing geologic maps, specimen recovery and petrologic analysis of samples from outcrops supposedly identical to the building material of the monument of interest, comparing of the results.

Out of two monuments studied so far one gave positive results encouraging farther application of the approach on other cultural heritage sites. Rock outcrops identical to two of the most massively used rock kinds (greyish porphyritic, vesicular, basalt and phaneritic andesite) used as building material of the Tiseli Church (Borjomi Municipality, Georgia) have been identified on the field.

Less successful attempt on Satkhe Church (Bolnisi Municipality, Georgia) might be caused by the existence of active open pit gold mine close to the church, during the operation of which pyroclastic deposits of interest might have been removed completely together with mine tailings as the local tuffs still exposed to the surface do not coincide with tuff blocks in the church walls.

The approach is now being tested on a larger geographical scale for a group of bronze age structures (mostly built by stream borne igneous boulders and some non-clastic limestone blocks) located on Shiraki Plateau (350 square kilometers) (Dedoplistskaro Municipality, Georgia) that has no permanent water streams or any kind of rock deposits/outcrops on it.