Hyaku-Ana which is ancient graves of 6-7 centuries. The cave was suffering from severe salt efflorescence and deterioration of its cause. Salts are much in dry winter but less in humid summer. We set up twelve investigation points for monthly monitoring of temperature and humidity. Fallen salts and debris at each point were also collected monthly from November 2008 to December 2009. Main salt minerals, detected by XRD, are hard and granularly effloresced alunogen ($Al_2(SO_4)_3.17H_2O$) on the walls near the entrances, and gypsum was found on the inside walls in the humid summer. On the contrary, powdery effloresced halotrichite ($FeAl_2(SO_4)_4.22H_2O$), sodiumalum ($NaAl(SO_4)_2.12H_2O$) and epsomite ($MgSO_4.7H_2O$) were detected in the dry winter. Jarosite ($KFe_3(SO_4)_4.(OH)_8$) minerals were observed on iron hydroxide stains on the walls in every season. Halotrichite, sodiumalum and epsomite damaged the walls most severely especially in the dry winter. The amount of salts and debris from the inner wall were greater than those from near entrances.

New data on the position of so called „klippes" in succession of the marginal units of the Outer Carpathians

Olszewska B., Paul Z., Ryłko W. and Garecka M.

Polish Geological Institute-State Research Institute, Carpathian Branch; Skrzatów str. 1, 31-560, Krakow, Poland, barbara.olszewska@pgi.gov.pl,zbigniew. paul@pgi.gov.pl.,wojciech.rylko@pgi.gov.pl, mgar@pgi.gov.pl

The large olistoliths of the Upper Jurassic rocks (the "klippes") occur at the northern and the southern margin of the Outer Carpathians. Controversies concerned not only origin of "the klippes' but also the age and sedimentary character of the surrounding rocks. Earlier interpretations of position of the northern "klippes" located them within folded and tectonised Cretaceous-Paleogene sediments of migrating Carpathian accretionary wedge. Our investigations lead to amendment of the view. The research was carried on the following marginal units along the Outer Carpathians: the Ždanice unit (Czech Republic: Mikulov, Klentince, Štramberk), the Skole unit (Poland: Inwałd, Roczyny, Targaniczanka, Kruhel), the Boryslav-Pokuttya unit (Ukraine: Utoropy, Akroshory), the Marginal Folds unit (Romania, Slon, Draina). The results of research are as follows:

1. In the region of Mikulov (Czech Republic) the Upper Tithonian "klippes" are embedded in the Lower Miocene Ždanice-Houstopeče Formation. 2- The Upper Jurassic "klippes" that occur in the marginal part of the Skole unit in Poland, on the base of the foraminifera and the calcareous nannoplankton, are surrounded by the Lower Miocene sediments. Different is, however, the origin of "the klippes". In the western part of the Skole unit "the klippes" represent the marginal part of the European Plate, while in the eastern part the Kruhel "klippes" derived from the Bilche-Volytsa zone of the Ukrainian part of the Foredeep. 3- Samples of matrix collected from the gravelstone containing a Štramberk-type (peri-reefal, Tithonian-Berriasian) limestones at Utoropy and Akreshory (Ukraine) revealed the presence of the Early Miocene foraminifera and calcareous nannoplankton. Sediments surrounding the Ukrainian "klippes" at Utoropy are the same as in case of the Kruhel "klippes" and represent the Lower Miocene Vorotyshcha Formation. 4 – Romanian samples collected from the Slon olistostrome (Slon and gypsum formations) confirmed the Early Miocene age of sediments. Peri-reefal limestone olistolits from the Slon locality are of the Late Tithonian-Berriasian age.

The above presented results of studies suggests that, at least northern "klippes" (predominantly of the Tithonian-Berriasian age) are embedded in sediments that have character of chaotic complexes and are of the Early Miocene age.

Acknowledgements: The studies were supported by the Polish Ministry of Science and High Education grant N.N. 525 40 25 34.