ozone content (especially, at high solar zenith angles), and quite similar aerosol influence on both types of biologically-active irradiance. Using the updated criteria for vitamin D3 threshold from CIE 2006 we estimated the biologically active UV irradiance over northern Eurasia. The spatial and seasonal distribution of UV favourable conditions has been analyzed both for the clear sky and for the cloudy atmosphere. The calculations were based on the TOMS/OMI total ozone and effective UV reflectivity datasets. The latter one has been used for estimating the effective transmittance in cloudy conditions. The aerosol parameters necessary for computations were taken from a specially developed aerosol climatology, which has been obtained on the base of ground-based AERONET dataset, radiometric Russian datasets and satellite MODIS retrievals (collection 5) over northern Eurasia. A special attention was paid to estimating the uncertainties of MODIS AOT dataset. We found the large AOT biases in spring conditions over Siberian area. The specific features of the defined favourable UV conditions for different time periods are discussed for the various types of human skin in the clear and cloudy atmosphere.

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Role of the olistostromes and olistoliths in tectonostratigraphic evolution of the Outer West Carpathians

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The oldest olistostromes in the Outer West Carpathians are related to the Late Jurassic-Early Cretaceous rifting and post-rifting stage in which the Outer Carpathian deep sea sedimentary basins were opening. Then forming the proto-Silesian Basin later was split into separate tectonic units – Silesian and Subsilesian nappes. In the Silesian Nappe the oldest deposits are represented by the Vendryně Formation (Late Jurassic) that consists in many places of clasts and olistolithes of shales and marls. The Hradište Formation (Early Cretaceous) often bears debris-flow deposits rich of exotic-rock pebbles, but also olistostromes with olistoliths or olistoplaques of the Cieszyn and Vendryně formations.

In the Late Cretaceous – Paleocene took place a contraction. It was a formation time of subduction zones along the active margins and development of deep-marine flysch basins. The Magura, Dukla, Silesian and Skole basins have been formed then. Ridges separated them supplying the basins with huge amounts of coarse-clastic material marked by numerous debris-flow sediments and occasionally olistostromes and levels with huge olistoliths. They occur in the Upper Cretaceous, Paleocene and Eocene strata of the Silesian, Subsilesian and Skole nappes. Specially known are large olistholits of the Węgierka from the Upper Cretaceous deposits of the Skole Nappe Marls and the Frydek Marls with huge blocks of andesites and pebbles of other exotic rocks from the Subsilesian. In the Silesian Nappe the debris-flow with flysch olistolites and exotics are frequent within the Godula and Istebna Beds (Late Cretaceous –Paleocene), the Ciężkowice Sandstones (Early – Middle Eocene) and occasionally within the Hieroglyphic Beds (Middle – Late Eocene). The Middle Eocene olistostromes are known also from the Bystrica and Rača subunits of the Magura Nappe.

A collision of the European Platform with the Inner Carpathian terrain took place in the Oligocene and Early Miocene stage causing a development of the Outer Carpathian accretionary prisms. Evolving prism supported olistolithes and olistostromes to the basins until their structural closure. Especially in the inner part of the Silesian Nappe the Krosno Beds (Oligocene – Early Miocene) are rich of olistoliths and in some places olistostomes with large olistoplaques occur. Olistostroms at the top of the section of the Krosno Beds has finished sedimentation in the Silesian Beds. In the western part of the Subsilesian Nappe section of the Krosno Beds is ended with olistostrome rich of huge olistoliths of the Jurassic, Cretaceous and Palaeogene rocks as well as older crystalline. There occur spectacular blocks of Jurassic limestones forming the klippes of Andrychów, Pavlovske Kopce and Štramberg.

During the Miocene tectonic movements caused final folding of the basins' fill and created several imbricated nappes. The nappes are thrusted one upon another and all together overthusted the marine molasses of the Carpathian Foredeep developed on the North European Platform. From thrusting nappes large olistoliths glided down into the foredeep. Recently they are known from deep boreholes from bellow of the nappes. In front of the thrusting Outer Carpathian the molasses of fordeep were partly folded. It occasionally caused the formation of olistostromes, e.g. the Badenian evaporites known from the salt mines of the Wieliczka and Bochnia.

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Sedimentary basins evolution and olistoliths formation: the cases of Carpathian and Sicilian regions

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The early stage of basin formation in carbonate platform settings, from rifting to further crustal thinning, is generally characterised by mass movements from the faulted margins towards the stretching and drowning sectors. Avalanches, debris flows deposits with extrabasinal blocks, olistoliths, olistoplaque and olistostromes mark the sedimentary record. Block tilting, related to the normal activity of faults, determines the uplift of basin margins, shedding material for the formation of oliststromes. The onset of basin dynamics could be also marked by magmatic upwelling. During the late rifting stage, mass movements decrease, sediments supply with huge olistoliths and olistostromes is less common and coarse-grained deposits prevail, alternating with periods of pelitic sedimentations. Such sedimentary evolution may be observed in several basin successions, independent of their age and geodynamic setting. Good examples are the Northern Carpathian Basin and the Sicilian carbonate platforms-basins system, compared here because of their similarities.

During the Late Jurassic-Early Cretaceous, the Southern European Platforms system topped by carbonate sedimentation experienced rifting and that resulted in opening of the proto-Silesian Basin. Crustal stretching was accompanied by andesitic-teschenitic intrusions. The Late Jurassic-Early Cretaceous sequences of the proto-Silesian Basin were later split into different tectonic units. Neritic grey, black or brownish marly mudstones deposited during the Kimmeridgian-Tithonian were locally associated with debris flows containing olistoliths derived from the adjacent carbonate platform. The mudstones evolve during Tithonian-Berriasian into pelagic limestones and shales with a complex of turbiditic limestones, suggesting a relatively quiet tectonics. Starting from the Valanginian, turbiditic and conglomeratic sandstones with exotic blocks appear within the calcareous shales. Locally, huge olistostrome appears, containing both extrabasinal olistoliths as well as olistoliths derived from the faulted flanks of the proto-Silesian Basin. These coarse sediments evolve upwards to Hauterivian-Aptian black shales. At the end of early Cretaceous (Barremian-Albian), compressional movements started, increased tectonic activity begun and uplift initiated denudation of the margins and ridges and resulting in very thick-bedded sandstones, conglomerates and occasionally olistoliths deposited during Late Cretaceous and Early Paleogene. An oblique collision of the Inner Carpathian terranes with the North European Plate during the Late Eocene-Early Miocene led to the development of accretionary prisms of the Outer Carpathians; numerous olistostromes were formed during this time.