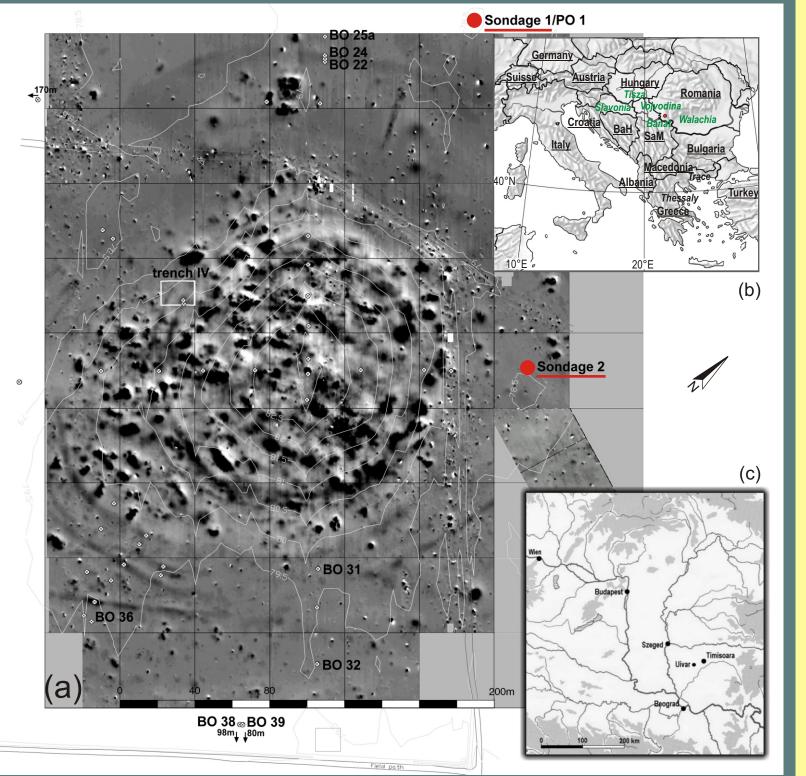


# Chronology of Holocene environmental changes at the tell site of Uivar, Romania,

and its significance for late Neolithic tell evolution in the temperate Balkans

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#### Problem

Compared to the alluvial landscapes of the southern Mediterranean Balkans (Thrace, Macedonia, Thessaly, fig. 1b), Neolithic tell mounds in the valley bottoms of the northern temperate Balkans (Slavonia, Vojvodina, Banat, Hungarian Tisza region) appear later in time and are abandoned earlier. According to available radiocarbon dates their shorter duration of existence is restricted to the first half of the 5th millennium BC.

The north-westernmost occurrences of Middle to Late Neolithic tell sites are found in the SE Carpathian Basin. Here the tell site of Uivar, situated in the wide lowland of the lower courses of the rivers Timis and Bega in the upper Tisza drainage in SW Romania, rises ~4.2 m above the valley bottom covering a surface of 3 ha (fig. 1). Its considerable size indicates an important settlement with central functions. The sedimentary archives of the surrounding alluvial landscape and the colluvia eroded from the settlement mound bear the potential to record and store the palaeoenvironmental information necessary for a Holocene landscape reconstruction. Therefore, geoarchaeological investigations were taken up to evaluate whether environmental changes might have been the reason for the shortened setllement activities.

Fig. 1: Study site of Uivar with positions of drillings (cross signatures) for sedimentological (BO#) and palynological analyses (PO#), sondages and trenches. The figure is based on the geomagnetic site map of Becker (2004), which reveals an inner ditch system at the tell footslope (e.g. at trench IV) and an outer ditch system encircling the tell at a distance of ~100 m (e.g. at BO22, BO24).

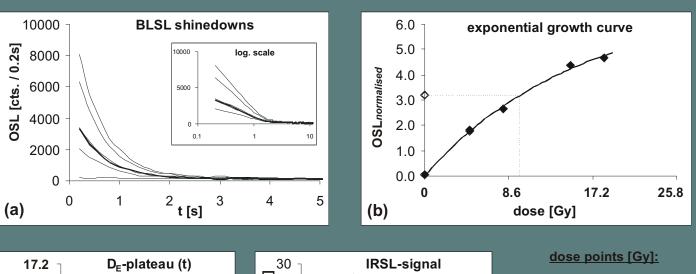
#### Results

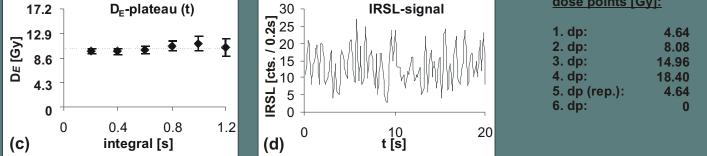
The geomorphologic survey reveals significant changes of the alluvial landscape around the Late Neolithic/Early Copper Age tell site of Uivar. Today the plain is filled and almost evenly levelled by mid-late Holocene sediments (figs. 3+4). Underneath, a more pronounced (e) palaeo-relief is buried consisting of a formerly active floodplain to the north and a flood-safe lower terrace to the south (fig. 5). The early tell site was situated at the fringe of the floodplain, presumably on a slightly elevated river terrace remnant.

As OSL-dating reveals partial bleaching of the waterlain sediments (e.g. fig. 2e), only maximum ages can be given. Fluvial reworking of the sandy alluvial silts lasted at least until ~6.5 ka (HDS-1287, HDS-1288, HDS-1281 in figs. 6+7, OSL-ages with 1- error-level). This corresponds to the age of ~6.4-6.9 ka of charcoal remains from the lower parts of the infillings of the interior ditch system at 'trench IV' (fig. 1) (Hd-22930 4775-4365 cal BC, Hd-22751 4850-4695 cal BC, Hd-22659 4830-4625 cal BC, 14C-ages with 2- error-level). Since the dates for the inner ditches and the surrounding sediment are not discriminable, it is most likely that the earthwork was built just after a time when more intense fluvial activity ceased ~6.5 ka ago at the beginning of the Holocene Climate Optimum. In contrast to later periods, at that time the groundwater table must have been much lower, reaching well below the bottom level of the Neolithic ditches, which otherwise would have collapsed in the non-cohesive sediment. Corresponding contemporary changes in fluvial dynamices were observed at tell localities on the Teleorman river in S-Romania (Bailey et al. 2002) making a climatic signal likely. This hypothesis is confirmed by the climatic record of a stalagmite from Ursilor Cave, NW-Romania, which after a cooling event with increased rainfall ~7 ka ago reveals normal-wet conditions after ~6.8 ka (Onac et al. 2002). At Uivar all the other sediments clearly post-date the Neolithic settlement period. No geoaarchaeological evidence was revealed that might explain the early abandonment of the settlement mound in the Early Copper Age period.

### **Methods**

As the alluvial plain does not provide any natural exposures, sediments were gained from undisturbed drilling cores and artificial open-cuts (fig. 1). Analyses include the determination of grain-size distribution, pH-value, carbonate contents, total organic contents and pollen assemblages. A chronometry was established using 14C-dating of organic components and optical stimulated luminescence (OSL) dating of the minerals. Quartz coarse grain (125-212 µm) was analysed with a single aliquot regeneration (SAR) protocol using small aliquots (~200-500 grains) (Fuchs & Wagner 2003) (fig. 2), while the feldspar component of polymineral fine-grains (4-11  $\mu$ m) was dated with an infrared stimulated multiple aliquot additive (IRSL MAA) protocol (Lang et al. 2003).





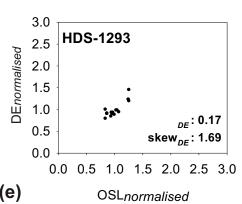
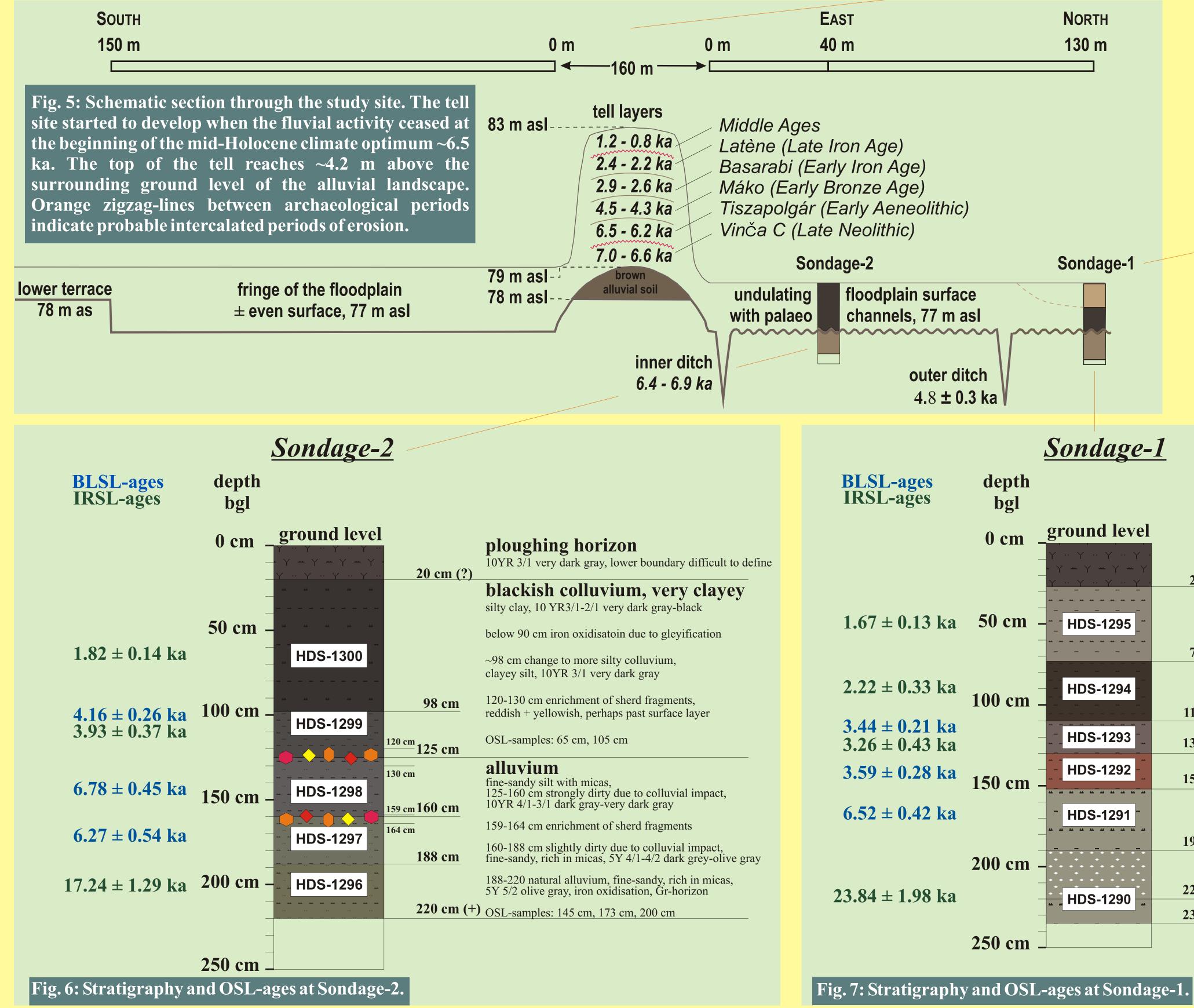


Fig. 2: BLSL SAR DE-estimation of a quartz coarse-grain aliquot from the colluvial sample HDS-1293 (a-d). Measurements were carried out on a TL/OSL Reader **Risø DA15. SAR parameters** 

are: preheat 10 s @ 260 °C, cutheat 10 s @ 160°C, blue-light stimulation (BLSL) 20 s @ 125°C (LEDpower 90%), UV-detection through Hoya filters U340 (3 x 2.5 mm each). As the Uivar samples show differential bleaching (e), BLSL-ages were calculated from the lower edge of the DE-distribution that exhibits similar -values as do artificially well bleached and dosed subsamples.







**Fig. 3:** View from the tell site to the northern sector. Today the surface of the alluvial plain is even, levelling an underlying relief of a former fluvial landscape.



Fig. 4: View into Sondage-1 showing the upper layers (ploughing horizon, alluvium, colluvium) of the profile wall.

ploughing horizon

10YR 4/2 dark grayish brown

