

# New neolithic circular enclosures

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**Abstract:** In 2003 and 2004, four circular enclosures, found by aerial reconnaissance, were measured by geophysical methods. The magnetometric measurements of total vector of a magnetic field were carried out by a caesium magnetometer SMARTMAG SM 4G (Scintrex, Canada). The magnetic field was prospected in duo-sensor configuration. The sensors were placed 0.3 m above ground and the horizontal distance between them was 0.5 m, which enabled the measurement of two profiles simultaneously. The magnetic field prospection was set to an interval of 5 measurements per second. The geophysical profiles distance was 0.5 m and the chosen interval provided an average pace of measurement along the profile 0.20 m. The accuracy of the measurements varies from 0.5 to 1 nT. The quoted data were statistically calculated on a basis of repeated measurements along a chosen number of profiles on the site. Standard methods incorporated in the Oasis Montaj 5.08 system (Geosoft Inc., Canada) were used for elaboration of the data measured and all the basic and derived maps.

**Key words:** aerial archaeology, magnetometry, neolithic enclosures

## 1. Bajtava, Nové Zámky district

The circular enclosure (Fig. 1) was found by aerial prospection as a soil mark in 1994 (*Hanzelyová et al., 1996*). It is situated on an elongated ridge with S–W exposition, 216 m a.s.l. The view from its area is in NW to SW direction.

Only two thirds of the enclosure were measured in 2004, the remaining area being occupied by a vineyard. Magnetometric measurements covered an area of 200 × 150 m. Anomalies with the intensity of -11 to 16 nT can be distinguished on the final magnetic map (Figs 2a, b). Their width varies from 4 to 6 m. They are concentrated into closed geometric units – a system of two ditches. We can say that this is another non-standard kind of the circular enclosure, where the outer ditch forms an oblong rather than a circle

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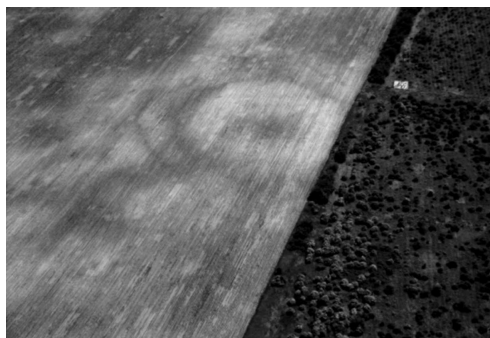


Fig. 1. Bajtava, aerial photography.

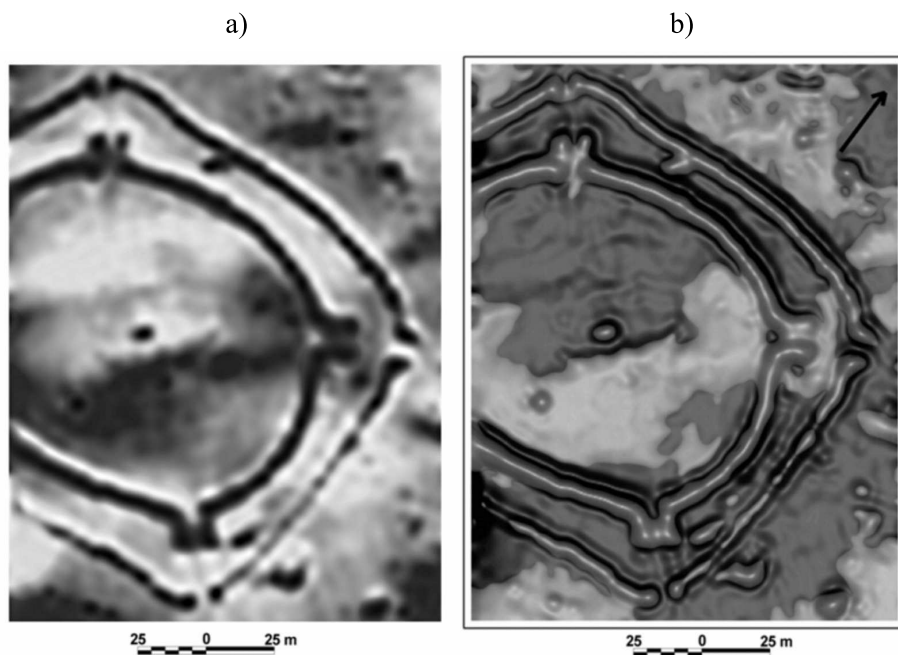


Fig. 2a, b. Bajtava, map of residual magnetic anomalies (a) contour (b) shaded.

or an ellipse. Other anomalies with the intensity of 1 to 2 nT run parallel to the ditches approximately half-way between the ditches. Anomalies of the same intensity skirt the ditches from both the outer and inner sides. Their interpretation is not clear; they might have been palisade trenches or other unfinished ditches.

Dimensions of the outer ditch are  $188 \times 130$  m in NE–SW direction and  $150 \times 115$  m of the inner one in N–S direction. Maximum distance between outer edges of the wing-shaped entrances is 190 m. The measurement proved three entrances oriented in NE–SW and NW directions (Fig. 3).

The inner ditch has remarkable wing-shaped entrances reaching the length of 16 m. The outer ditch entrances are only delineated, bent inward on the NW side, and reaching the length of 6 m. The total length of the entrance corridor in the SW is 34 m, NE 37 m and NW 38 m. The width of the

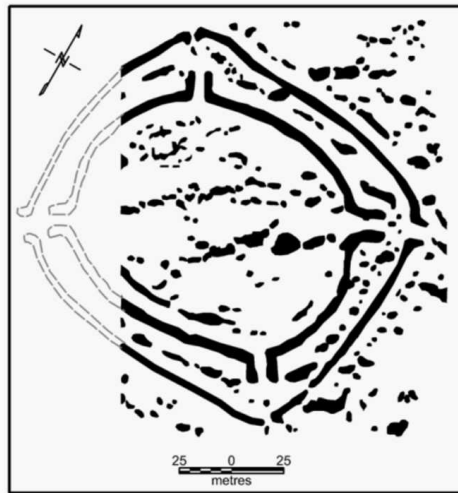


Fig. 3. Bajtava, interpretation of geophysical measurement.

wing-shaped entrances of the inner ditch is 5 m, the width of the outer ones varies from 2 to 5 m. Collected finds date the enclosure to the stage of Lengyel I (4800 – 4700 CAL BC).

## 2. Prašník, Piešťany district

The circular enclosure here was recognized on a vertical photograph taken in 1985 (*Kuzma, 2002*) and proved by aerial reconnaissance in May 2002. It was recognized as an inexpressive soil mark that formed two incomplete concentric circles (Fig. 4). The enclosure is situated in a moderate valley.

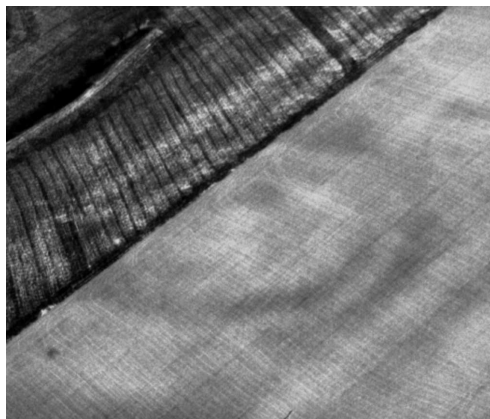


Fig. 4. Prašník, aerial photography.

The place gives a possibility of SE view, but only in a limited range of approximately  $80\text{--}85^\circ$ . It lies on the SE slope, 310–322 m a.s.l., with overtopping of 12 m between its lowest and highest point.

In 2004, a geophysical measurement was done, which proved only one ditch as opposed to two indicated on aerial photographs. As for the circular enclosures recognized as a soil mark, the need of verification of results obtained by aerial prospection has been confirmed again. In some cases a number of ditches increased after geophysical measurements – from two to three in Golianovo (*Kuzma and Tirpák, 2001*) and to six in Žitavce (*Kuzma and Tirpák, 2003*). A situation similar to the one in Prašník was in Ružindol - Borová, where a number of ditches was reduced to one (*Tirpák, 1997*) after geophysical measurements.

Magnetometric measurements covered an area of  $150 \times 150$  m. Anomalies with the intensity of -6 to 11 nT can be distinguished on the final

magnetic map (Fig. 5). Their width ranges from 4 to 7 m – i.e. a ditch with the diameter of 130 m. The measurements proved four simple entrances, N–S and E–W oriented, with the width of 3–6 m.

Other anomalies with the intensity of 0.5 to - 2 nT are placed inside



Fig. 5. Prašník, plot of residual magnetic anomalies.

the enclosure. They follow the ditch in two lines in the distance of 11 and 19 m. The diameter of the first one is 90 m, of the other one 70 m; their width is 1 m. The inner line has two interruptions, one wing-shaped with the length of 7 m outwards, the other has wings 8 m long and inwards; the width between them is 10 m on the south and 13 m on the north side. The outer line has four interruptions, 28 m wide on the north and south-western side and 6 m on the eastern one. The wings on the northern side are oriented inward, on the eastern one outward. The interruptions of the both lines correspond to the entrances of the main ditch only as far as the northern entry is concerned.

The most surprising result of the geophysical measurements, however, is 12 vivid anomalies with the intensity of 4 to 16 nT and the diameter of 4 to 6 m, which are periodically spaced out among the ditch entrances. They

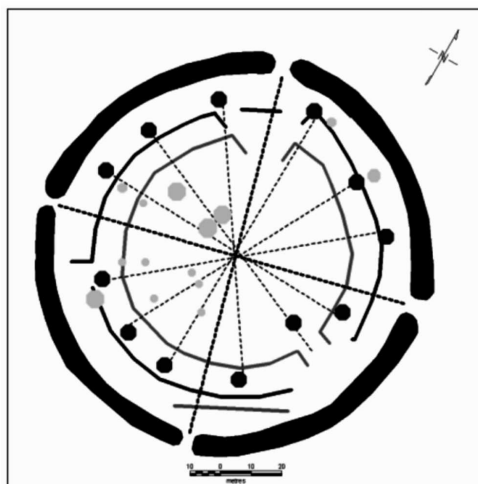


Fig. 6. Prašník, interpretation of geophysical measurement.

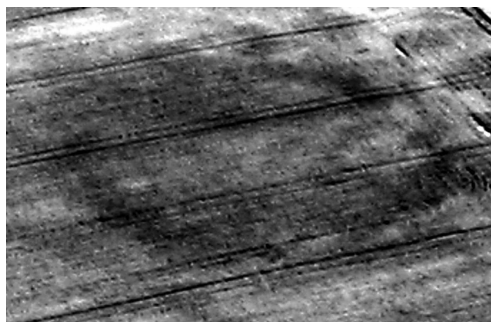


Fig. 7. Nové Sady, aerial photography.

are three pits between two interruptions. When we connect the opposite pits with abscissas, their points of intersections are placed approximately in the centre of the enclosure (Fig. 6).

Two other concentric circles with inexpressive point anomalies with the intensity of - 0.5 to 1 nT were found inside the inner line, always on the axis of the abscissas of border pits. The diameter of the inner circle is 38 m

and 60 m of the other one.

Analogies to this disposition have not been known until now in the Central European area. The closest one seems to be the henge from Stanton Drew in southwestern England, which inside a ditch with the diameter of 135 m contains nine concentric circles of postholes, and a system of further pits following the ditch passing in the distance of ca. 6 m (<http://www.eng-h.gov.uk/archaeometry/StantonDrew>). In this case there exists a hypothesis that it could be a timber posts construction of a circular hall structure with a diameter of 90 m; it might have been roofed. As far as Prašník is concerned, it is too early to state any hypothesis; more verification is needed, preferably by archaeological excavations.

Material finds from field-walking date the site into the Lengyel culture period.

### 3. Nové Sady, Nitra district

The circular enclosure was found as a crop mark in 2003 (Fig. 7). It appeared as a circular ditch without observable interruptions, with a line crop mark in the length of cca 400 m in its vicinity.

Magnetic measurement was realised on the area of  $60 \times 90$  m. Magnetometric measurements covered an area of  $150 \times 150$  m. Anomalies with the intensity of  $-5$  to  $10$  nT can be distinguished on the final magnetic map (Fig. 8).

The enclosure has dimensions of  $54 \times 50$  m with the ditch width of 4–5 m and two simple entrances in E–W direction. Field walking brought only a few finds with several fragments of the young linear pottery - such dating, however, is not probable.

### 4. Zemianske Sady, Nitra district

The circular enclosure was recognized as a soil mark in 2000 (Fig. 9). It appeared as a slightly oval ditch with observable interruptions. Magnetometric measurement on the area of  $70 \times 70$  m revealed an anomaly that was concentrated into a closed slightly oval formation with the diameter of

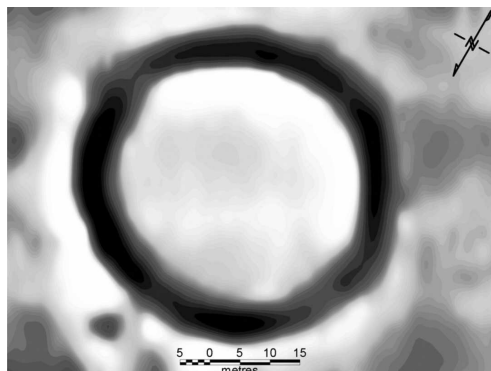


Fig. 8. Nové Sady, plot of residual magnetic anomalies.

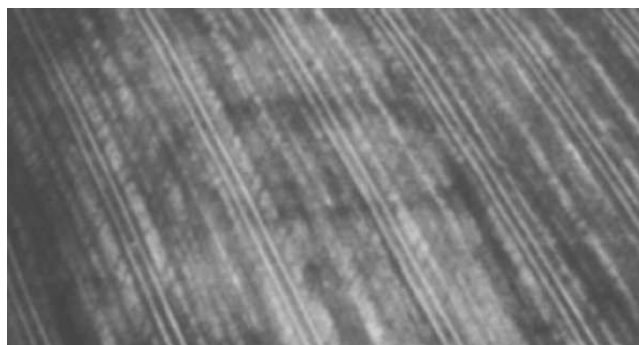


Fig. 9. Zemianske Sady, aerial photography.

45 × 51 m (outer dimension of the ditches), with the ditch width from 4 to 5 m.

Anomalies with the intensity of -2 to 6 nT can be distinguished on the final magnetic map (Fig. 10). The enclosure has two simple entrances with NE-SW direction. Shape of the ditches is unusual, their ends in entrances are slanted and they are not situated exactly one against the other.

Function of the anomaly that goes along the ditch in its southern section is not clear, existence of another ditch can not be excluded.



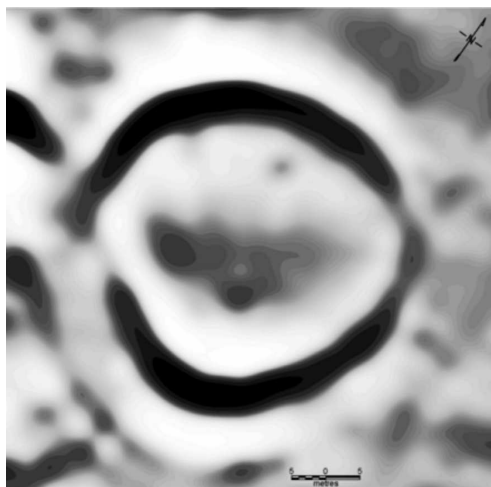


Fig. 10. Zemianské Sady, plot of residual magnetic anomalies.

**Acknowledgments.** The author is grateful to VEGA, the Slovak Grant Agency (grant No. GP 3176) for the partial support of this work.

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