by malachite (in rare cases with azurite), serpentinite, carnelian, agate, coal (jet), marble and shells. Some of the carnelian beads from Varna display 16+16 facets along their elongation, which is the first record for a constant and complex faceting of hard mineral known so far. An early prehistoric weight system links mineral beads and gold artefacts (the weight unit "van" is introduced, 0.4 g = 2 carats). The first report of turquoise beads for SE Europe is related to the Orlovo prehistoric site (Haskovo district). The "Thracian stone" in ancient sources is identified also as heliotrope, which is known since the Chalcolithic in the Eastern Rhodopes. Some of the artefacts are masterpieces of art and as stage of perfection, thus pointing to the Balkans as a cradle of prehistoric gemmology.

The use of GNSS technologies for application in mining, geology and geodesy in Bulgaria

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A review on the use of GPS technologies for application in mining and geology on territory of Bulgaria is presented in this paper. Some particular results concerning the application of GPS in opencast mining in Bulgaria are presented and analyzed. The essentials of them are periodical survey of mine working; investigation of slope strain; management of output and transportation of mining mass. In the area of geology and geophysics are discussed some results on application of GPS on: geological mapping and assaying; gravity investigations; deformation of earth's crust; investigation of landslide processes; coordination of platforms for oil and gas production etc. Plans for future work on the above issues are discussed too. The problem of the combined processing of GPS and other types of classical geodetic measurements concerning the higher accuracy of the result is still topical. In the proposed paper a better accuracy in the vertical component of the GPS-networks has been sought. It is suggested that the results from the spirit levelling expressed by heights should be used. Observation equations of heights (orthometric or normal) can be included in the mathematical model for processing of GPS measurements. In these equations a simplified model of geoid (quasigeoid) is involved. A numerical example for the combined processing of GPS measurements with EDM and spirit levelling heights has been presented. The results confirm the expected higher accuracy of the height component.

Efficiency of the Chiprovtsi mining site remediation with regard to heavy metal and arsenic environmental pollution

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A Program for the liquidation of the inefficient ore-mines in Bulgaria was started by the government in 1992. One of the main goals of the program is to eliminate the negative consequences of the mining industry to the environment. Restoration and remediation measures are envisaged for the mining sites only but not for the affected areas outside as the heavy metal polluted rivers and their floodplains. Evaluation of the efficiency of the environmental recovery of the mining affected landscapes in the upper part of the Ogosta River basin, NW Bulgaria, is the overall purpose of this study. Three mines (Au; Fe; Pb-Ag)