Geophysical Research Abstracts, Vol. 7, 02297, 2005
SRef-ID: 1607-7962/gra/EGU05-A-02297

Non-desctructive Georadar Researches in the Area of Road Subsidence of Motorway near Postojna, Classical Karst, Slovenia

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Non-destructive georadar measurements were carried out in the area of road subsidence on the motorway section Unec-Postojna. We tried to determine the reasons causing the roadway deformations and subsidences and to define the potential critical areas where new or repeated subsidences may occur. By specified raster of GPR we determined 3D positions of lithologically different rocks below the roadway, the location of karst phenomena (fissures, karst caves, shafts) and tectonically broken (crushed) zones in these rocks. By georadar data we defined the mechanism of void occurrences (subsidence) below the roadway and delineated the critical areas. The location of roadway subsidence is found in a wider area of the contact between higher located limestone and lower lying flysch. Limestone represents the aquifer with opened inclined fissures and bedding-planes coinciding with dip of limestone towards the contact limestone – flysch. In a wider area of the lithological contact the limestone is distinctively crushed and karstified. Considering a wider background, dip of limestone beds, high water permeability of opened fissures and bedding-planes and their dip one may find out that in a rainy period a large amount of groundwater flows in the area of crushed zone between limestone and impermeable flysch. These waters wash off the intermediate unconsolidated material in the area of crushed zone consisting of broken and karstified limestone, rubble and loam. The downwashing is additionally accelerated by the oscillation in the groundwater level.