Geophysical Research Abstracts,
Vol. 11, EGU2009-5982, 2009
EGU General Assembly 2009

The temperature variations of sinking rivers in karst

F. Gabrovsek and J. Turk

Karst Research Institute ZRC SAZU, Postojna, Slovenia (gabrovsek@zrc-sazu.si, +38 65700 1999)

Karst aquifers are often fed by concentrated inputs such as sinking streams originating from the adjacent non-karstic areas. When entering an underground conduit system a stream experiences new flow regime which can be much different from the surface one. An important parameter which also reflects the new environment is the temperature. The temperature of surface streams is a result of surface climatic and hydrological conditions, such as a stream discharge, air & ground temperatures and the solar radiation. These impose stream temperature variations of different amplitudes and frequencies. Water temperatures follow seasonal and diurnal cycles, latter being superimposed on the former. Along the underground course, a river exchanges heat with the surrounding karst massif. The conductive heat exchange between the stream water, the hyporheic zone and the cave walls become more important, whilst radiative heat fluxes is to a greater extent diminished. We present analyses of the long term continuous monitoring of temperature and discharge of sinking river Pivka in Postojnska jama, Slovenia. To analyse and interpret the results we applied a simple finite difference model assuming heat exchange between river, hyporheic zone and surrounding rock mass.