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The transnational geo-scientific initiative GURN (GNSS Upper Rhine Graben Network) – Recent results and future plans

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In September 2008 the Institut de Physique du Globe de Strasbourg (Ecole et Observatoire des Sciences de la Terre) and the Geodetic Institute of Karlsruhe University (now: Karlsruhe Institute of Technology) established a transnational cooperation called GURN (GNSS Upper Rhine Graben Network). Within the GURN initiative these institutions are cooperating in order to carry out geo-scientific research in the framework of the transnational project TOPO-WECEP (Western and Central European Platform; link: http://www.topo-wecep.eu), which succeeded the former project URGENT (Upper Rhine Graben Evolution and NeoTectonics; link: http://comp1.geol.unibas.ch) of the EUCOR universities (European Confederation of Upper Rhine Universities) and TOPO-EUROPE (link: http://www.topo-europe.eu). The research within GURN is actually based on GNSS (Global Navigation Satellite Systems) in order to establish a highly precise and highly sensitive network of permanently operating GNSS sites for the detection of recent crustal movements in the Upper Rhine Graben (URG) region. GURN actually consists of approx. 75 permanently operating GNSS sites of different German, French and Swiss data providers.

The actual work in the context of GURN is dominated by a detailed analysis of the results of a first reprocessing of all existing GNSS observations (since 2002). This analysis contains comparisons of the processing results derived at EOST and GIK, where different software packages and processing strategies are used. Another important aspect is aiming for the detection of inconsistencies in the coordinate time series in order to get reliable time series, which can be used to derive site velocities. To reduce the Eurasian trend of the coordinate time series in order to derive highly precise intra plate velocities of the sites, different comparison approaches are tested. The behaviour of time series of the GNSS sites has to be analysed in detail, in order to detect the reason for jumps, which are mostly caused by instrumentation changes. Some jumps are due to other reasons, e.g. snow- or ice-covered antennas. Such limiting effects have to be handled with care.

In the presentation, a short introduction into the history of GURN will be given. In the main part of the presentation, some selected examples of the current work will be shown. The presentation will end with an outlook to future work.