INTERNATIONAL GEOGRAPHICAL UNION

STUDY GROUP ON ENVIRONMENTAL CHANGE AND EXTREME HYDROLOGICAL EVENTS

First Meeting, August 28 and 29, 1998
Centro de Estudos Geograficos, University of Lisbon

Meeting held in Room 2.1 of the Faculty of Arts (Faculdade de Letras) of the University of Lisbon (Metro station Cidade Universitaria).

Session 7
PALAEOCLIMATE, PALAEOFLOODS AND PALAEODROUGHTS

1640-1700
PALAEOFLOOD ANALYSIS OF THE TAGUS RIVER (CENTRAL SPAIN) USING SLACKWATER DEPOSITS
G. Benito, A. Sopeña, M.J. Machado, and A. Pérez-González

1700-1720
PALEOCLIMATE RECONSTRUCTION USING GEOTHERMAL DATA
V.B.Svalova

1720-1740
IMPLEMENTATION OF A REGIONAL PALAEOFLOOD DATABASE: THE PALAEOTAGUS DATABASE
M. Fernández de Villalta Compagni, A. Díez-Herrero, G. Benito and L. Laín-Huerta

1740-1750 Concluding remarks by the Vice-Chair

wells the depth is near 500 m. For a full geothermal data base and data bank construction it is necessary to combine all temperature logs together with heat transfer and heat generation data for the same cross-sections.

New approaches and new models of geothermal problems decision can arise during the development of geothermal science. Initial geological information, and to some extent geothermal data, is very important and has its own value connected with the possibility to state new fundamental and applied problems. Also it is necessary to take into account that very often it is impossible to repeat expansive measurements and many boreholes are destroyed.

For the Russian platform more than 80 geothermal borehole data were collected. 11 temperature logs of Belgorod region were investigated. The inversion showed a ground surface temperature minimum between 1500-1750 with pronounced warming there after reaching a maximum at about 1900. The 20th century is characterized by some cooling and later on by recent warming.

The geothermal method of past climate assessment yields the temperature of the Earth's surface, which may be different from local air temperature which is subjected to hydrogeologic and ecological conditions and reflects also man-made interference. The pure climatic effect is thus not always evident. More than 200 data on air-ground temperature relationships were analysed.

Air temperature analysis from 1821 to 1965 for Moscow region shows increases in middle year temperature every ten years of 0.1 °C, but there was a minimum around 1860 and a maximum around 1930.

The analysis of modelling for different regions shows similar results for the Russian Platform, South Ural and Kirgistan (Issik-Kul area). The results of paleoclimate reconstructions for West Siberia differ from them due to permafrost zone effect.

The comparison of temperature trends for Moscow and adjacent regions of the Russian platform gives opportunity to evaluate the warming industrial effect, that is very important for decisions on ecological problems.

The results of geothermal investigations together with other methods confirm global climate warming. At the same time in the background of the warming there are thermal anomalies connected with human activity and urban area effects.

As there are many different factors affected in temperature changes, it is necessary to carry out wide area geothermal investigations together with the development of fundamental approaches to the new geothermal problems and to combine and store the great quantity of geological-geophysical data.

IMPLEMENTATION OF A REGIONAL PALAEOFLOOD DATABASE: THE PALAEOTAGUS DATABASE

M. Fernández de Villalta Compagni[1] , A. Díez-Herrero[2] , G. Benito[1] and L. Laín-Huerta[3]

[1] *CSIC-Centro de Ciencias Medioambientales, Serrano 115 bis, 28006 Madrid, Spain.*

[2] *Departamento de Medio Ambiente, Universidad Europea de Madrid, Villaviciosa de Odón, 28670 Madrid, Spain.*

[3] *Instituto Tecnológico Geominero de España, Rios Rosas 23, 28003 Madrid, Spain.*

The study of spatial and temporal flood distribution and the palaeohydrological analysis of flood magnitude and frequency, based on stratigraphic and historical records, provides a highly effective tool for risk analysis and long-term planning. The organisation and systematisation of hydrological information on past flood enables a detailed regional analysis to be made of extraordinary events and their related hydroclimatic scenarios. The Palaeotagus database was set up to compile, analyse and interpret the paleoflood data generated within the Spanish part of the Tagus river basin (Central Spain). This relational database is supported by a standardised and compatible database management system which not only allows information to be stored but enables it to be studied quantitatively and qualitatively using graphic applications and numerical analysis tools. The general aims of the regional Palaeotagus database are: (1) to compile and store effectively all the historical and stratigraphical palaeoflood information, (2) to analyse palaeohydrological data, using their spatial and temporal variability and the quantitative values of certain parameters (discharge, flood stage, etc.), and (3) to interpret the results of the analysis in terms of regional hydroclimatic variability and flood hazards. A significant feature of the Palaeotagus is that the database is connected to a Geographic Information System

installed on an ARC/INFO v. 7.03 for Workstation software which is widely used world-wide, and this palaeoflood data can be processed using other friendly software such as ARCVIEW v.3.0a. Since there are two different palaeohydrological datasets (historical floods and palaeostage-based discharge data using slackwater deposits), two independent but interrelated databases have been created (HISTORIC and GEOLOGIC). In the historical flood database, the primary data table contains information on the year, month and day(s) of the flood, stream, site, discharge, causes and damage. In addition, the primary data have been used to generate a series of reference tables; locations, streams, causes and damages. The location and stream code are linked to georeferenced points, ares, and polygons in the graphic coverage. Flood data obtained from palaeostage indicators (GEOLOGIC) have been stored in a hierarchical structure similar to that of GLOCOPH (Branson, 1995). This makes it possible to group together datasets in sub-drainage basins and subdivide them progressively into specific locations, places and records.

Branson, J. 1995. *The GLOCOPH database. Data structure information*. Geodata Institute, University of Southampton, UK, 30 pp.