The Royal Meteorological Society The Royal Meteorological Society

Legacies fund report

International Workshop on River Runoff: minima and maxima, held at St

Petersburg, 6-8 June 2001. Edited by Vadim Kuzmin, Pieter van Gelder & Colin

Clark.

This meeting was organised through the Russian State Hydrometeorological

University. Before the meeting started I was asked to help edit the abstracts

which had been sent from over 10 different countries. With a deadline of just a

few days quite a lot of hard work had to be done quickly.

The conference was introduced by Professor Anatoly Vladimirov who stressed the

importance of understanding the extremes of river runoff. This was then followed

by Vadim Kuzmin who welcomed all those present. The first session was chaired by

Kaoru Takara who also gave the first paper on Storm and flood frequency analysis

in Japan. He used a variety of methods to analyse annual maximum discharge at 99

sites in Japan. This was followed by Adien Van de Griend who described the

University of Amsterdam runoff model for simulating the storm hydrograph. A

particular feature was the use of groundwater replenishment and depletion by a

non-linear function. The model has been used on upland catchments in Italy and

lowland ones in the Netherlands.

Gabriele Salvatore then presented a case study of a flood in September 2000 in

the Soverato river basin. Although data exists for rainfall no runoff data are

available. The effects of fires on runoff were considered and the flood was

simulated for both before and after the impact of the fires on local vegetation.

Yuri Sokolov then presented his paper through an interpreter, about the use of

river level data in conservation measures on the river Danube.

Nataliya Agaltseve then described the computation and forecasting of droughts in

central Asia. Droughts are often preceded by low rainfall in the headwater areas

during winter. The reliability of the forecast depends on the lead time - 80%

accuracy for 6 months, 90% accuracy for a 4 month lead-time.

Vladimir Lobanov then explained the methods used to estimate the effect of human

activity on extreme runoff under changing conditions. The natural regime must be

estimated using stochastic and deterministic methods.

Lev Kitaev explained the importance of snow cover on the water balance of the

Volga and Yenisei rivers. Both the snow cover and temperature of the

winter-spring period are important factors in runoff and the water balance.

Farda Imanov described the effect of droughts on river runoff of the River Kura

in the Azerbaijan Republic. Other rivers were studied and 1971 was a dry year,

with dramatic effects on minimum flows, with the effect of low rainfall during

the previous year being important.

Leonid Korytny then explained how he and his co-workers had analysed the history

of floods in eastern Siberia. The data are important for the assessment of flood

risk zones in the Irkutsk region of Russia.

The following day began by Pierre Hubert and Daniel Shertzer describing the

background and the importance of fractal in hydrology. The basis for the

approach is empirical data which was shown to have spatial and temporal

variation at several different scales and this variability may help to simulate

extremes in hydrology.

Corrado Corradini described his methods for predicting flood runoff with special

emphasis on the process of infiltration. Saturated hydraulic conductivity values

were used in a model of infiltration processes.

Esko Kuusisto described some important storm events in Finland and their

resulting floods. The flood of 1966 was the worst so far recorded in the south

of Finland while in the north the event of 1922 or 1924 was probably the worst.

Heavy summer thunderstorms are important on a local scale as in 2000.

Jose Vergara then described the intraseasonal changes in the rains and floods in

Chile. Analysis of 10 years data show many events occur with a periodicity of

20-60 days with a peak at 31 days. This result could be used to implement an

extended rainfall and flood forecasting system.

Nikolay Abasov then described the use of low flow periods on Lake Baikal in

relation to water management, especially in relation to energy consumption and

ecological risk. The current low flow period of 1996-2002 is probably an

acceptable risk period based on previous experience.

Konstantin Klevanny then described the method of forecasting floods on the river

Neva which flows through St Petersburg. Storm surges force water into the Gulf

of Finland which can cause flooding in the city. A flood barrier has been built

but it cannot be entirely shut (like the Thames barrage) because of flood water.

Therefore prediction of floods is necessary. A warning time of 36 hours is now

operational.

N Golyandian then described the use of the Caterpillar singular spectral

analysis on a 120 year time series of lake levels, and river flow on the Danube.

Predictions of the future were suggested as being possible but some doubts were

expressed by several questions raised.

The final day began with Pieter Van Gelder explaining the use of the

Fokker-Plank-Kolmogorove equation in hydrological modelling. River runoff is

described as a combination of a stochastic process, a long period component,

short period, and a noise component. The model was fitted to the data and there

is a need to further test the model.

Colin Clark then described a 360 year flood frequency curve for the river Avon

at Salisbury which was based on a combination of historic flood levels and

measured flood flows at a nearby site at Amesbury. This is the first such record

for a permeable catchment on chalk.

Vadim Kuzmin explained a model of estimating riverflow. The model needs to be

tested against a bigger data set while at present the results are close to

observed values.

Tatyana Ilina described the use of a shallow water model for analysing storm

surges on the river Neve/Gulf of Finland. Major events took place in 1777, 1824

and 1924. The use of the geostrophic wind force will probably improve forecasts.

Boris Gartsman then told the meeting about his annual flood cycle model to

estimate peak discharges on rivers in eastern Russia. The model is useful

because very little data is available. Estimates of extreme floods using

historic rainfall data are good.

Anna Voznjak explained why it is necessary to estimate rainfall in upland areas

of the Amur basin in eastern Russia: no gauging stations. A model of snowmelt

and rainfall-runoff was described which takes into account the big differences

between the upland and lowland parts of the drainage basin.

The conference was, of course, broken up by several excursions to the local area

and a memorable boat trip down one of the several canals in the city and thence

on the river Neva. A fine spread of good food, wine and Vodka insured that all

the spirits were kept at peak flow for the duration of the outing, even if one

or two of the participants missed the boat and were later rescued from the side

of the canal, all had an excellent time.

There are three memorable places which I visited: the Hermitage Museum, housed

in the winter Palace of Peter the Great; the summer Palace with its grand

cascade; but perhaps most of all if size and impact are considered was the

Church of the Saviour of the Blood, built on the spot where Alexander II was

killed in 1881. Its interior walls are nearly all covered with icons made from

mosaics in overwhelming proportions and beauty.

I was looked after by a colleague of Vadim Kuzmin whose care will always be

remembered, not least for being presented an omelette which completely filled

the frying pan and which was consumed in the pan as served on the table!

I am more than grateful for the financial support from the British Hydrological

Society in being able to attend the meeting - without which it would have been

impossible. I am also grateful to the other organisers of the meeting and for

the help which they gave both personally and collectively to make my stay in

Russia enjoyable. Quite a lot of discussion took place both during and after the

sessions which I have described making the meeting a very good contribution to

all of our work.

Colin Clark

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