



Global and regional aspects for genesis of catastrophic floods – the problems of forecasting and estimates for mass and water balance (surface and groundwater contribution)

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1. The principal goal of present talk is, to discuss the existing uncertainty and discrepancy between water balance estimation for the area under heavy rain flood, on the one hand from the theoretical approach and reasonable data base due to rainfall going from atmosphere and, on the other hand the real practice surface water flow parameters measured by some methods and/or fixed by some eye-witness (cf. [1]).

The vital item for our discussion is that the last characteristics sometimes may be noticeably grater than the first ones. Our estimations show the grater water mass discharge observation during the events than it could be expected from the rainfall process estimation only [2].

The fact gives us the founding to take into account the groundwater possible contribution to the event.

2. We carried out such analysis, at least, for two catastrophic water events in 2015, i.e.

(1) torrential rain and catastrophic floods in Lousiana (USA), June 16-20; (2) Assam flood (India), Aug. 22 – Sept. 8.

3. Groundwater flood of a river terrace discussed e.g. in [3] but in respect when rise of the water table above the land surface occurs coincided with intense rainfall and being as a relatively rare phenomenon.

In our hypothesis the principal part of possible groundwater exit to surface is connected with a crack-net system state in earth-crust (including deep layers) as a water transportation system, first, being in variated pressure field for groundwater basin and, second, modified by different reasons (both suddenly (the Krimsk-city flash flood event, July 2012, Russia) and/or smoothly (the Amur river flood event, Aug.-Sept. 2013, Russia)). Such reconstruction of 3D crack-net under external reasons (resulting even in local variation of pressures in any crack-section) is a principal item for presented approach.

4. We believe that in some cases the interconnection of floods and preceding earthquakes may occur. The problem discuss by us for certain events (e.g. in addition to these above events, for the 2013 Colorado flood (USA)).

5. Thus, we believe that now is the time to have the transition from «surface view» – i.e. observable results by eye-witness and consequences of the water events, to «fundamental approach» – i.e. measured physical parameters during the continuous monitoring and possible mechanisms of their variation.

References

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