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The relationship between largest daily events contribution to suspended sediment load and catchment size at continental scale.

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Extreme events are a key aspect of geomorphological problems and responsible of high amount of work and "time compression" of geomorphological processes. Time compression means that high amount of total geomorphological work is produced in a very short temporal intervals (i.e. in few events). The classical approach define extreme event as a rare event identified by its magnitude and quantified by some deviation from central value. By the other hand, from magnitude-frequency analysis it is well know that few events not necessarily extreme by magnitude, could be responsible of high amount of geomorohological work. Last but not least, to analyzed the time compression of geomorphological processes a new complementary approach has been suggested recently (González Hidalgo et al., 2008, EGU) based on the effects of "largest events", defined by rank, whatever the magnitude.
Here we have analyzed at continental scale the relation between largest daily event contribution to total suspended sediment load and catchment size using a massive dataset of daily suspended sediment load from United States Geological Survey (USGS Ancillary database), and Hydrological Service of Canada (HYDAT dataset). The total amount of catchments is >1857 and daily events >2,960,118. Catchments differ by climatic conditions, land use, relief, lithology etc. The whole study area covers mostly of the temperate and sub-polar latitudinal climate conditions.
As catchment size decrease the percentage contribution of largest daily event to total suspended sediment load increase and it means that temporal compression of suspended sediment load is exacerbated in small catchment. Independently of magnitude of processes it means that in small catchment the temporal frame of suspended sediment load is more and more independent of climate conditions as catchment size decrease. We analyze regional differences of such behaviour.