

First flush effect of hazardous substances during a flash autumn flood in an intermittent Mediterranean river.



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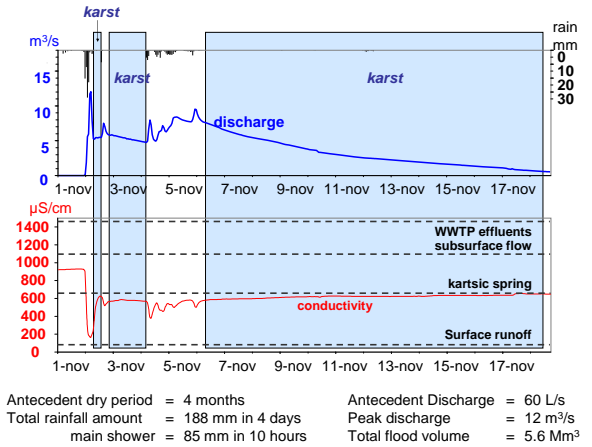
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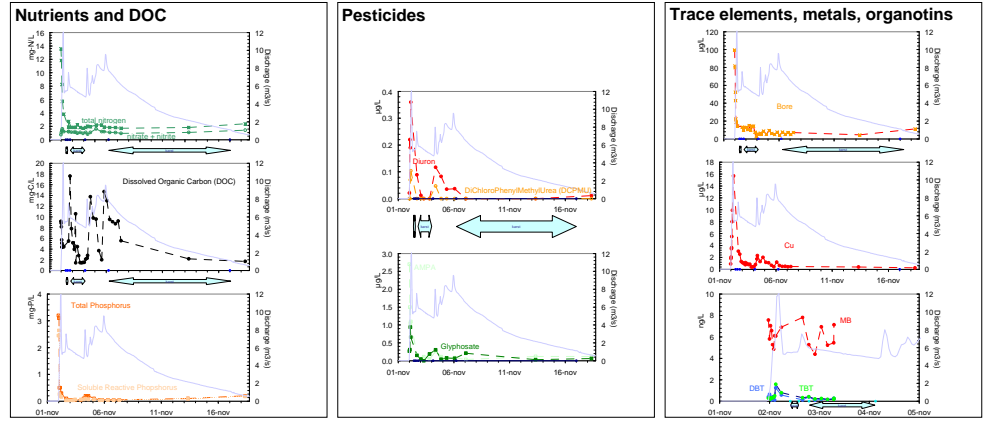
First flush effects are illustrated on the example of a intermittent Mediterranean river, in a karstic rural context, for different hazardous substances, during a first autumn flood.

Particulate contaminants are mobilized during the first period of the flood while dissolved ones follow the dynamics of the discharge.

HYDROLOGICAL DYNAMICS



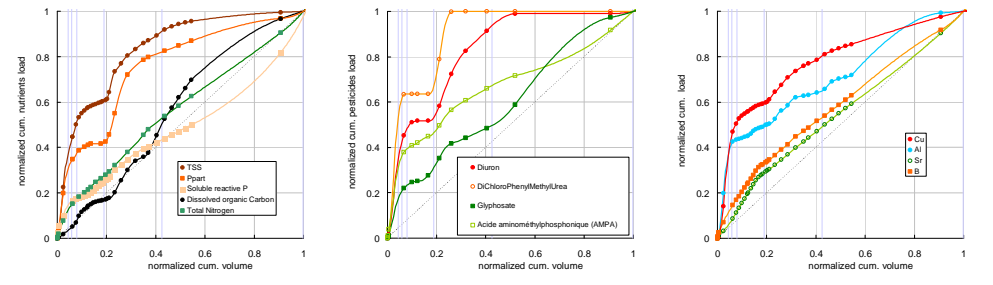
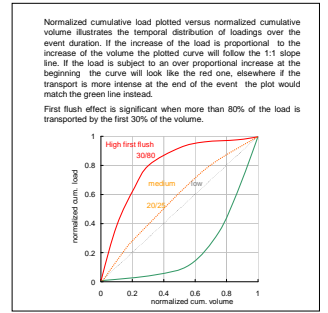
CONTAMINANT DYNAMICS



FLUSH EFFECT

The three normalized cumulative load plots below show that:

- more than 50% of particulate material (TSS, Ppart) are flushed away by the first 25 % of cumulative flow.
- at least 50% of the pesticides are flushed away by the first 20% of the volume
- Aluminum and copper are subject to medium to high flush effect.
- Dissolved elements, such as SRP, DOC, bore and strontium, are transported the same way as the water.



CONCLUSION

First flush effects are most of the time addressed in urban hydrology. However they are often more accurate for intermittent rivers, even in rural contexts, as shown here.

During a first autumn flood, occurring after a long dry period, first flush effects are obvious for all particulate contaminants. Attached to mineral particles they are removed from the dry hillslopes or from the dry riverbed, during the rising of the flood. When karstic springs start flowing, the effect is reduced because the significant volumes is due to karst water.

Dissolved contaminants did not show the same dynamics as particulate ones. Dissolved contaminants and discharge increase jointly, then dilution effect is visible.

ACKNOWLEDGMENTS

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