Posteropdracht voor het vak Water 1 (HWM-10303) van Wageningen Universiteit

Flash floods risk in World Heritage site Colares-Sintra

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How does men promote the risk of flash floods in Colares?

The phenomenon of "flash" floods in Colares (Sintra, Portugal) has a high probability of occurrence, due to its own properties but mostly as result of human influence.

Area description

The Colares riverside is inserted in a very special place, Sintra, much appreciated by both inhabitants and tourists, having many dispersed population centres next to it. The "Serra" of Sintra presents a wide biodiversity and variety of crop fields. Even though there aren't many days of rain along the hydrological year in the watershed Colares, it features sometimes heavy and concentrated rains that lead to flash floods.

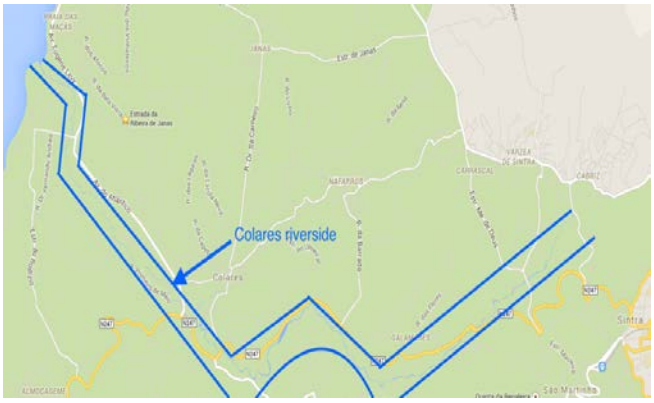

Figure 1:"Ribeira de Colares" rises in the north of Sintra Hills at an elevation of 250 meters and ends the route at the mouth in the "Praia das Maçãs" beach [1].

Results

The riverside of Colares has a small watershed of 52km2 surface area and a roughly circular geometry, which makes this area particularly dangerous relative to flash floods.

*Figure 2: Colares Village and "Serra" of Sintra (*10 km length by 528m altitude) *[2].*

The normal low flow of water contrasts with the intensity of rainfall during the winter, causing floods with serious consequences in the valleys near the foot of the Sintra mountain, in particular Colares.
Because Sintra one of the UNESCO World Heritage Sites is and due to its rich culture/history, is this town increasingly becoming a tourist destination over the last few years and also a target of strong demographic pressure. With rampant occupation of the Colares watershed and constructions, resulting in **soil sealing and deforestation**, water and sediment are more easily conducted to the Colares River, dragging solid particles to the river and this being forced to overflow.

Figure 3: Image of the last flood in Colares, 2008 [3]

Global warming is either determining with regard to the risk of flooding in Colares. In the first place the increasing temperature directly affects the permeability of the soil and the surrounding river vegetation, decreasing the absorption of rainwater. Beyond that, due to this increase in local temperature water flows are weak, leading to a kind of "indifference" by the authorities concerning prediction of flood risk and the necessary space planning. Along with the economic crisis, profit interests prevail and more houses are built, taking up locations that naturally belong to the flood bed.

Conclusion

Demographic pressure, tourist attraction and the indifference of the respective bodies allowing the above mentioned constructions to occupy the flood bed are the main direct influences of man on the risk of flash floods in Colares, while global warming also indirectly promotes this phenomenon.
Management policies of water resources, improvement in the flow conditions, surveillance and flood warning systems (even though limited due to the sudden nature of these floods) are useful measures to be taken.

Referenties

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