Using GIS to establish an emission type based sampling scheme for xenobiotics with passive samplers in Luxembourg

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Waste Water Treatment Plants (WWTP) have been identified as a major source for pharmaceuticals in river networks in recent years. WWTPs remain neglected as a source for pesticides although a substantial body of evidence shows that especially for chronic exposure WWTPs have a significant impact. Monitoring xenobiotics is a cumbersome and costly endeavour if the dynamics of the emissions are to be taken into account. The other aspect is the identification of locations where the exposure is expected to be the highest and most frequent. This poster presents an approach which used GIS and WWTP information to identify typical immission situations in Luxembourgish rivers. The following five immission situations were considered: Rivers impacted by high WWTP discharge, subdivided in those with more urban connections to the WWTPs and those with farms owning lots of agricultural land. The latter are more prone to emissions from left-over spilling of pesticides and spraying equipment cleaning. The second source group targets runoff from surfaces with low- and high infiltration soils and impermeable urban surfaces as categories. All Luxembourgish water bodies have been analyzed with a GIS system in order to isolate monitoring locations that would best correspond to one of the categories defined above. Twelve sampling locations have been monitored in the main pesticide application seasons with 14 day passive sampler exposure summing up to 4 months monitoring at each spot. The results served to establish a ranking of most detected pesticides and pharmaceuticals and to verify the soundness of the allocated emission sources. In addition the mean exposure has been compared to ecotoxicological assessment methods such as SPEAR, toxic unit as well as pesticide mixture evaluation. The poster discusses the combination of GIS and passive samplers as a reliable monitoring approach.