

Night-time lights as a proxy of human pressure on freshwater resources

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The presence and availability of freshwater resources at the global scale control the dynamics and the biodiversity of river ecosystems, as well as the human development and the security of people and economies. The increasing human pressure on freshwater is known to potentially drive significant alterations on both ecohydrological and social dynamics. To date, a spatially-detailed snapshot (i.e. single in time) analysis of human water security and river biodiversity threats revealed that the majority of the world's population and river ecosystems are exposed to high levels of endangerment. However, the temporal evolution of these effects at the global scale is still unexplored. To this aim, moving from the recent progress on remote sensing techniques, we employed yearly averaged night-time light images available from 1992 to 2013 as a proxy of anthropogenic presence and activity and we investigated how threats to human water security and river biodiversity evolved in time in 405 major river basins. Our results show a consistent correlation between nightlights and ecohydrological and threats, providing innovative support for freshwater resources management.