



Population and climate pressures on global river water quality

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We present a global analysis of the combined effects of population growth and climate change on river water quality. In-stream Biological Oxygen Demand (BOD) concentration is calculated along global river networks using past, current and future information on gridded population and river discharge. Our model accounts for the accumulation (from populated areas), transport, dilution, and degradation of BOD to reveal the combined effects of population growth and climate change on river water quality. From 1950 to 2000, our analysis indicates that rivers that flow through regions with increasing population undergo a prominent deterioration of water quality, especially in developing countries with a lack of treatment plants. By 2050, population growth and climate change have varying effects on degradation of river water quality, with their combined effect amplified in region undergoing both population growth (more pollutant loading) and decrease in discharge (less dilution capacity).

Keywords: Population growth, Climate change, River water quality, Space-time analysis, Water management