

Looking for water quality

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Introduction

On the one hand the water quality field is increasingly diverse and complex, on the other hand there is an increasing demand from the public, water managers and all stakeholders for simplified water quality indicators integrated over time and space, and appropriate to specific issues. The evolution of water quality is also of concern at the global scale (Vörösmarty and Meybeck, 2004). Questions raised by this evolution are presented here in the hope of opening a forum on this topic.

Is Water Quality a Human Construction?

The appreciation of water quality is in constant flux. Water quality perception through its colour, turbidity, taste or effects on humans and animals is as old as water use, but the first water chemical analyses are as recent as 200 years ago. Between 1850 and 1900, regular monitoring was already being performed at water intake stations on the Thames and Seine rivers, focusing on a few descriptors such as resistivity, dissolved oxygen, ammonia and chloride.

Throughout the 20th century, water quality studies and monitoring have developed exponentially (Figure 1) according to: (i) *the water demand* (e.g. major ion analyses for irrigation needs in the USA since the early 1900s and in the Soviet Union since the 1940s, total suspended solids (TSS) surveys prior to river damming since the 1930s, faecal contamination surveillance at drinking water intakes); (ii) *the development of issues* (eutrophication since the 1960s, acidification in the 1970s); (iii) *new pressures* (radionuclides since the 1950s, pesticides since the 1980s, endocrine disruptors more recently); and, most of all, (iv) *the development of analytical chemistry*. There has been a stepwise development of indicators (i.e. the combination of several basic descriptors) in some periods, such as the standard 5-day biological oxygen demand (BOD₅) and chemical oxygen demand (COD) used for oxygen balance models since the 1930s and the eutrophication indicators developed by Vollenweider in the late 1960s.

In parallel with these developments, aquatic ecologists have produced ecological indicators of overall stream quality, such as the saprobic index, the Trent River index or the biotic index set-up by Woodywiss, which has been continuously used throughout the former Soviet Union for several decades (Kimstach *et al.*, 1998). The quality of the physical habitat of aquatic systems has also been