Automatic high frequency monitoring for improved lake and reservoir management

Abstract:
Recent technological developments have increased the number of variables being monitored in lakes and reservoirs using Automatic High Frequency Monitoring (AHFM). However, design of AHFM systems and posterior data handling and interpretation are currently being developed on a site-by-site and issue-by-issue basis with minimal standardization of protocols or knowledge sharing. As a result, many deployments become short-lived or underutilized, and many new scientific developments that are potentially useful for water management and environmental legislation remain underexplored. This paper bridges scientific uses of AHFM with their applications by providing an overview of the current AHFM capabilities, together with examples of successful applications. We review the use of AHFM for maximizing the provision of ecosystem services supplied by lakes and reservoirs (consumptive and non consumptive uses, food production, and recreation), and for reporting lake status in the EU Water Framework Directive. We also highlight critical issues to enhance the application of AHFM, and suggest the establishment of appropriate networks to facilitate knowledge sharing and technological transfer between potential users. Finally, we give advice on how modern sensor technology can successfully be applied on a larger scale to the management of lakes and reservoirs, and maximize the ecosystem services they provide

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