

In-situ monitoring of the Seine River based on the MeSeine network

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Introduction

In Europe, the management of freshwater ecosystem is governed by the Water Framework Directive (2000/60/CE) and its transposing legislation in France (2006-1772 of December 2006). The good ecological status of water are evaluated using a combination of several indicators such as biological and physico-chemical parameters. The Seine River crosses several important urbanized areas of France, including the Parisian conurbation (9 millions inhabitants). To ensure the good ecological status of the Seine River, the Greater Paris Conurbation Sanitation Authority (SIAAP), has constructed and operated the MeSeine network since 1990. MeSeine constitutes a tool for evaluating the quality of the Seine river and its tributaries (Marne, Oise) in terms of physico-chemistry, bacteriology, micro-contamination and faunal diversity.

The MeSeine network extends along 125 km of the Seine River (from Choisy to Méricourt) and over 13 km along the Marne River (from Champigny to Alfortville). It is structured around three pillars:

- Real time monitoring of the physico-chemical composition of the Seine river using in situ sensor, in particular dissolved oxygen and temperature sensors
- Sampling and laboratory analysis campaigns to monitor watercourses quality and comply with the quality standards as defined by the Water Framework Directive (good ecological and chemical parameters)
- Biota monitoring to appreciate the diversity of fish populations, macro-invertebrates and diatoms.

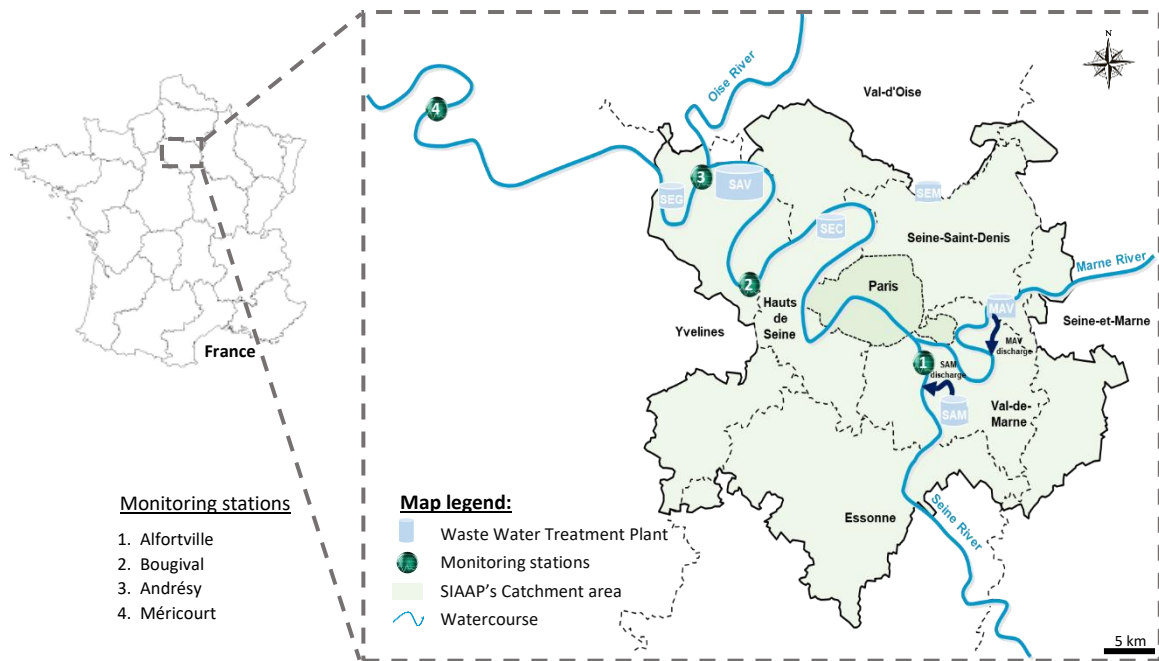
The aim of this work is to provide dissolved oxygen and temperature data of the Seine, generated by the in-situ sensors of the MeSeine network, via the open platform Zenodo. Another work including data on the physico-chemical quality of the Seine river is available via the same open platform using the following keywords: MeSeine network, Seine river, physico-chemical parameters, quality (*DOI: 10.5281/zenodo.7229793*).

Network description

The MeSeine monitoring network coordinated by the Innovation Department of SIAAP since 1990, measures temperature and dissolved oxygen at 4 key stations in Seine river. In-situ sensors (Table 1) have been distributed, over **110 km** from upstream to downstream of Paris conurbation, to provide a representativeness of aquatic habitats in urban areas. Sensor sites have been selected in order to monitor the quality of several water bodies with a logical focus on those into which SIAAP's treatment plants discharge. The location and characteristics of the sites and the treatment plants are shown in figure 1.

Table 1. In-situ continuous measurement stations and water bodies monitored by the MeSeine network

Water body	Monitoring station	Location	Hydrographic KP	Data	
				Dissolved oxygen	Temperature
HR73B	Alfortville	Port-à-l'anglais pontoon	626,152	92794	96449
HR155B	Bougival	SIAAP pontoon	683,063	85243	89242
HR230A	Andrésy	Andrésy dam	706,228	83166	85180
HR230B	Méricourt	Méricourt dam	754,220	90600	99833



MAV: Marne Aval Plant, 75 000 m³/d; SAM: Seine Amont Plant, 600 000 m³/d; SEM: Seine Morée Plant; 50 000 m³/d; SEC: Seine Centre Plant; 240 000 m³/d; SAV : Seine Aval Plant 1 500 000 m³/d ; SEG : Seine Grésillons Plant, 300 000 m³/d.

Figure 1. In-situ continuous measurement stations monitored by the MeSeine network

Dataset description

The dataset “Dataset_HF_MeSeine.xlsx” includes the hourly dissolved oxygen and temperature data and covers the period from 2010 to 2021. It is based on the calculation of an average of the measurements every 15 minutes. All measurements are carried out using the LDO sensor (DOC023.98.80170) from Hack-Lange. It should be noted that data gaps could be present, owing to maintenance works, upgrades or extreme hydrological conditions.