The St. Lawrence Estuary (SLE) in Quebec, Canada is characterized by two main geological provinces with different mineralogical and chemical signatures: The Canadian Shield on the North Shore and the Appalachian Region on the South Shore. The SLE is usually divided into two regions: the Upper Estuary including the Maximum Turbidity Zone and the Lower Estuary. The suspended particulate matter (SPM) dynamic in the SLE is strongly influenced by winds, tides, river runoff and the presence of ice in winter. The particle size distribution is an important property of the SPM as it may affect settling rates, particle residence and the spatial distribution of pollutants. Little information exists concerning the particle size in the SLE and the SPM’s origin. A few studies have previously been done but didn’t cover the complexity of this dynamic system very well.

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**Objectives**

- Unmeasure the particle size distribution in the SLE
- To what is the spatial and vertical distribution
- To define the SPM mineralogical and chemical composition
- What are the essential sources

**Methods**

**Sampling**

Water samples collected with benthic baskets:

- Chlorophyll
- Suspended particulate matter

With an optical profiler were measured the following properties:

- Optical Scattering coefficient
- Chl fluorescence
- Chl a fluorescence
- Biochemical (ECN)
- Light absorption

**Winter 2019**

- Particle size distribution from water samples was obtained with various instruments.
- Suspended particles and Chlorophyl

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**Results**

**Spatial variability**

**Vertical PSD**

Although being in different regions of the SLE, the stations show a similar vertical profile with dominance of small size particles (Fig. 2). In winter 2019, a higher number of particles at large size classes are present near the surface. Station S3, representing the Saguenay shows a lower number of small particles compared to the other summer and winter stations. Stations 12 and 3 (Upper Estuary) are similar except for larger size particles (present in higher numbers down to depths of 50m in winter).

**Composition of surface SPM**

**Conclusions**

- Small and medium size class particles in summer than winter
- Large size class in winter in the Lower Estuary (ESM) and may come from ice transport
- Large size classes present near the surface in winter
- Vertical variability between seasons than spatial
- SPM composition indicates the Canadian Shield as the main source of particles in the SLE

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