

Evolution du carbone organique particulaire «algal» et «détritique» dans trois rivières du Bassin Parisien

Evolution of algal and detrital components in the particulate organic carbon of three rivers from the Bassin Parisien

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Avec 13 figures et 3 tableaux dans le texte

Abstract

Seasonal chlorophyll variations have been set up on 20 stations of the Vire, Oise, and Seine rivers in the french Bassin Parisien. For the Vire and Oise these variations have been compared to those of particulate organic carbon (POC). Despite the similarity of the three rivers (regime, high nutrients levels), the chlorophyll levels and variations, and the algae counts are somewhat different. Chlorophyll behaviour, which can be homogeneous along river stretches from 50 to 100 km, is linked to hydrodynamic and climatic conditions.

Two major types of POC have been defined: first the "algal POC", which is linked to pigments and comprises both living and dead phytoplankton, then the "detrital POC", essentially allochthonous. These forms have been separated for each sample on the basis of POC/chlor.-a (SCOR-Unesco) ratio in river algal biomass estimated to 30. This value is the lower limit of the ratio, which reaches 500 in winter. As the high-water periods, occurring in winter in the three studied rivers, and the algal production periods are shifted, the seasonal variation of detrital and algal POC are opposite. Detrital POC is dominating during the winter time at any station and is up to 3 mg C/l; it increases with water discharge. During the summer time POC levels are very variable from one station to another. In the downstream section of the Vire river where reaches are numerous the algal POC (0.5 to 0.8 mg C/l) exceeds the detrital POC (<0.2 mg C/l) during 3 months. In the Oise river detrital POC is relatively high (1 to 3 mg C/l) all through the year due to bottom sediment stirring caused by navigation, but is still exceeded by algal POC (2 mg C/l) during the algae blooms (chlor.-a > 60 µg/l). In the yearly POC budget the algal form represents 9% of the total river-borne POC in the upstream section of the Vire river, where slopes exceed 10%, and 17% in the downstream section. In the river Oise this proportion rises to 32% due to the higher plankton production.

Depuis dix ans, les études de la matière organique dans les rivières se sont multipliées. Elles ont pour objectifs: 1) de mieux connaître la géochimie des eaux de surface (WAGEMANN et al. 1977; ZOBRIET et al. 1977; CAPLANCQ & DECAMPS 1978). 2) de déterminer les apports de carbone organique à des lacs (WETZEL & OTSUKI, 1973; ODUM & PRENTKI, 1978) ou aux océans (MALCOLM & DURUM, 1976; MULHOLLAND & WATTS, 1982; DEGENS, 1982; MEYBECK, 1982). 3) de considérer une des sorties en carbone de bassins versants forestiers