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## The sea surface $^{14}\text{C}$ reservoir age: review and perspective of its use in paleoceanography

### Contenu

In the modern (preindustrial) ocean, the sea surface reservoir age (SSRA) varies between 300 and 1200 yr. At steady state, the SSRA is determined by the mixing of young carbon from the atmosphere with older carbon from advected waters. The SSRA varies spatially in the ocean as it depends on air-sea gas exchange and oceanic mixing. It is thus sensitive to climate parameters such as sea-surface temperature, wind strength, sea-ice cover and air-sea  $\text{pCO}_2$  gradient (Bard 1988 *Paleoceanography* 3, 635). Two decades of paleoceanographic work indicate that reservoir ages have been variable at the surface and in the deep ocean. In particular, systematic increases of surface reservoir ages at high to mid latitudes seem to be linked to Heinrich events and similar stadials such as the Younger Dryas. One inherent difficulty of SSRA estimation is that most reconstruction techniques rely on a priori knowledge of the radiocarbon calibration curve. Fortunately, some methods are fully independent of the calibration itself (e.g. tephra as time markers dated by  $^{14}\text{C}$  on land and in marine sediments) and they also point to significant variations of the surface reservoir ages in the past ocean. In parallel to reconstructing paleo-SSRA values from geological archives, numerical models can be used to simulate SSRA as a response to past climate changes occurring over the  $^{14}\text{C}$  time range. I will discuss these issues in the light of the recent literature, notably by comparing the amplitude of SSRA changes in observations and in model runs and by assessing the possible magnitude of biases on the SSRA reconstructions based on marine sediments. I will also discuss prospective aspects linked to ongoing progresses, such as the ability to measure  $^{14}\text{C}$  in very small carbonate samples and the probable extension of the high-precision  $^{14}\text{C}$  calibration based on tree rings throughout the last deglaciation.

### Student Submission

No

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