N° 3, received on 12-04-07

Estelle Bortoluzzi (1,2),
(1) Université de Franche-Comté, Laboratoire de Chronoécologie, UMR 6565 CNRS, La Bouloie, 25030 Besançon CEDEX, France. *estelle.bortoluzzi@univ-fcomte.fr*
(2) Université de Franche-Comté, Laboratoire de Biologie Environnementale, EA 3184 USC INRA, Place Leclerc, 25030 Besançon CEDEX, France

Carbon balance of a cutover bog in Jura mountains at different stages of regeneration.

Harvested bogs lose their sink capacity, which is an important property in the present issue of climate change expected in the next years due to the increase of atmospheric greenhouse gases.
In order to reconstruct the carbon balance of a harvested bog in the Jura Mountains, three stages of regeneration were chosen: bare peat, recent regeneration with mostly *Eriophorum angustifolium* and advanced regeneration with domination of *Sphagnum.* Carbon fluxes and key driving environmental variables were regularly recorded during two entire growth seasons of vegetation, in order to establish an empirical model and to simulate carbon fluxes.
Considering the net carbon exchange, bare peat is a weak carbon source (between -19 and -32 g C m^{-2} y^{-1}) mainly due to its high water table level all over the year. During 2004 and 2005, the two vegetated stations acted as carbon sinks. The recent regeneration was slightly less efficient (between 67 and 166 g C m^{-2} y^{-1}) than the advanced regeneration (between 93 and 183 g C m^{-2} y^{-1}).
The increase of the bare peat respiration with the lowered water table has a negative impact of the carbon balance. This balance depends also on the relative quantity of bryophytes (which lose their sink capacity in case of drought) and of vascular plants (which facilitate CH_4 efflux). The return to a carbon sink function of these damaged ecosystems is so linked to the management practices and to the decision about techniques of restoration.

Key words: Peat bog, regeneration, CO_2, CH_4, photosynthesis, ecosystem respiration, carbon balance.