Interactive comment on “Constraining global methane emissions and uptake by ecosystems”
by R. Spahni et al.

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I would like to draw the authors’ attention to the ongoing debate about methane emissions from plants/vegetation. Although the contribution of vegetation to the global budget remains equivocal, an ever growing body of evidence suggests that plants do produce methane by several different abiotic and biochemical processes (a detailed list of papers on this subject is provided below). Furthermore, it has recently been shown that leaves of trees growing in wetlands emit methane in substantial quantities (Rice et al., 2010, Gauci et al., 2010). Most likely the methane emitted by the canopy comes from soil-derived CH4 either via internal air spaces or dissolved in the transpiration stream. Finally, very recently a paper has been published (Martinson et al. 2010) that describes methane fluxes from tank bromeliads; a common group of herbaceous plants in neotropical forests that collect water in tank-like structures. The authors suggested that methane emissions from these plants might differ from the other known vegetation sources as it is produced above ground in a ‘canopy wetland’ formed by unique structures of the plant.

Unfortunately in the current manuscript all information concerning methane emissions from plants/vegetation and the potential contribution of this source to the global methane budget has been neglected even though the paper deals with global biogeochemical process modelling of methane emissions from terrestrial ecosystems.

The paper would improve and benefit significantly if the authors were to include a section, e.g. in “3.5 Other sources and sinks”, discussing briefly our current understanding of the plant/vegetation sources. In this context it would be useful to also discuss that many living plants are able to mediate transport of methane from the soil to the atmosphere. Whilst it is clear that this topic is far from being fully understood and that conclusive emission rates are not yet available I would recommend that at the very least the authors should explain why the vegetation sources have not been considered for their global budget calculations.

Moreover, I must point out that the paper by Sanhueza and Donoso (2006), cited in section “3.3. Wet mineral soils”, has been misinterpreted. The paper actually deals with emission of methane from dry and green grasses (e.g. Trachypogon sp.). In the abstract of the Sanhueza and Donoso manuscript it is actually stated that “Results support the surprising discovery that vegetation emits methane”. I would request that the outcome of that study be placed into the correct context. To facilitate this it could be included with the section about our current understanding of methane emission from vegetation and discussed as to why it also has not been incorporated into the current global modelling studies. For more information about plant methane emissions I would like to refer to the papers listed below:

Bloom et al. Global methane emission estimates from ultraviolet irradiation of terrestrial


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