

## ***Interactive comment on “Biotic pump of atmospheric moisture as driver of the hydrological cycle on land” by A. M. Makarieva and V. G. Gorshkov***

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This is a very interesting paper because of its possible implications. I cannot judge most parts of the manuscript since I am a population geneticist. Section 4 however belongs to my competence.

The authors write the following:

"This contradiction is solved in the biotic regulation concept (Gorshkov, 1995; Gorshkov et al., 2000). First, it was shown that the degree of orderliness of ecological and biological systems is about twenty orders of magnitude higher than the degree of orderliness

of any of the so-called physically self-organized open non-linear systems (Gorshkov and Makarieva, 2001). Natural selection of competing biological objects (individuals) is the only way by which the biological information accumulates in the course of evolution. Therefore, any highly organized life property, including the biotic pump of atmospheric moisture, can only originate as a product of natural selection."

This sounds logical, but is unsatisfactory because it is a general and abstract argument. Natural selection works at the individual level. Whether it may work at other organisational level is limited to special cases (like genetic conflict between cell organelles). The authors try in the following part of the section to argue that selection on individual trees may lead to evolving biotic sensitivity in tree populations and also suggests what traits could mediate such evolutionary adaptation. As verbal reasoning it sounds acceptable, but standards in evolutionary population genetics require more than this to convince the reality value of your idea. The possibility for this scenario of evolution of biotic control should be properly modeled in a population genetic model. This is not necessary for this paper, since the focus of the paper is the pump idea, but let me say, to convince me as a scientist, it would require such a follow up. Rigid population genetic support would also help acceptance of your ideas for a somewhat wider public.

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