

Interactive comment on “Jet stream wind power as a renewable energy resource: little power, big impacts” by L. M. Miller et al.

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This is a very well written analysis of the implications of extracting kinetic energy from high level atmospheric winds (jet streams). It makes the point that relevant for the possible extraction rate is not the kinetic energy of the stream, but the impact of introducing an effective friction into a geostrophic flow that, before modification, was essentially frictionless and therefore required negligible energy input for its maintenance.

The analysis is based on a combination of a simple analytical model of the jet stream and extensive simulations with a global low-resolution numerical climate model. The analytical model provides a simple description of the basic dynamics of the jet stream, but is not closed, as the feedback of the energy extraction on the large scale pressure gradient that maintains the geostrophic flow must be parametrized. The problem is

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then closed through the extensive numerical simulations with the global climate model.

The paper concludes that the feasible energy extraction from jet streams is two orders of magnitude lower than estimated previously on the basis of faulty physics, is maximally of order of the total present world energy requirements, but, if realized, would imply major (non-acceptable) modifications of our present climate.

I have not checked the details of the calculations, but the argument is well presented, and even if the paper possibly gives rise to controversies among experts (to which I do not belong) regarding some details and numbers, should certainly be published.

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