

EGU2020-13284

<https://doi.org/10.5194/egusphere-egu2020-13284>

EGU General Assembly 2020

© Author(s) 2020. This work is distributed under the Creative Commons Attribution 4.0 License.



## Wave-mean flow interaction, forced triads, and recharge-discharge Processes as noncanonical Hamiltonian Systems

**Richard Blender** and Joscha Fregin

Hamburg, Meteorology, Earth Sciences, Hamburg, Germany (richard.blender@uni-hamburg.de)

We consider recharge-discharge processes in a forced wave-mean flow interaction model and in a forced Rossby wave triad. Such processes are common in atmospheric dynamics and are typically modelled by nonlinear oscillators, for example for mid-latitude storms by Ambaum and Novak (2013) and for convective cycles by Yano and Plant (2012). A similar behaviour can be seen in the simulation of a forced wave number triad by Lynch (2009). Here we construct noncanonical Hamiltonian and Nambu representations in three-dimensional phase space for available and prescribed conservation laws during the recharge and discharge regimes. Divergence in phase space is modelled by a pre-factor. The approach allows the design of conservative and forced dynamical systems.