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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Gravity wave reflection and its influence on the consistency of temperature- and wind-based momentum fluxes simulated above Typhoon Ewiniar" *by* Y.-H. Kim et al.

Anonymous Referee #2

Received and published: 9 September 2012

A very interesting study, which provides useful bounds on this error source in current satellite studies, which, while only one sources of uncertainty, has not previously been considered broadly.

Major Comments/Questions

1. (Important) In the abstract, you refer to percentages, but don't define what they're percentages OF until we get to section 3. I had no idea what you were trying to describe from the abstract, which is what most readers will look at.

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2. Do you think this model reproduces the expected dynamics of the gravity waves emitted from the typhoon well? You say it's the one that was studied by Kim et al (2009 and Kim and Chunk (2010), so I assume they discuss this amply, but just a brief statement of how good the agreement between model and the ECMWF/AIRS data is (if it is good!) would be appreciated.

3. You use Fourier Transforms to obtain the wave components in your analysis - this is fine for model data, but often more complicated methods (e.g. wavelet transforms, windowed Fourier transforms) need to be used for the limited coverage of real instruments. How would this affect your results?

4. Does the reflection of the waves at critical levels arise due to the internal model dynamics? It seems like the kind of thing that would be implemented sharply in a model but which would be fuzzed out considerably in reality, so you'd see it much me strongly here than it would actually occur.

5. You briefly discuss on page 6274 what a vertical study would show as opposed to this horizontal one, but it's all rather broad-brush - could you quantify the positive bias which would be seen in this type of analysis? This would seem much more useful - while some satellites like AIRS work in the horizontal, others like SABER and HIRDLS are vertical sounders, and your relts would be interesting to both groups.

Minor Comments

1. There seems to be some confusion over grammatical tense. Present or past is fine, but often both are used in the same pararaph. Not a major problem with understandin, but could do with tidying

P6266,L19-23: I assume this is a description of which part of the Kim et al (2009) model is used. If so, then the text should be re-arranged to put it next to the text saying this, rather than after the list of other datat sources - I'm not 100% certain which of the datsets it's refering to!

ACPD

12, C6724–C6726, 2012

P6267,L21: you describe here perturbations marked with tildes over them, but previously this notation was described as the complex Fourier coefficient. I'm confused - either you need to rewrite the sentence to say something other than perturbation or the notation has changed between sections. Given you go back to using $\sim$ to mean Fourier coefficients on the next page I'm especially confused

Figure 1: the Fw curve seems very smooth - is this what you'd expect?

Textual nitpicks (Not exhaustive)

P6264,L21 Needs slightly rephrasing - understandable but not quite grammatical P6264,L23 'amount of' unnecessary P6264,L24 various measurement "methods" or "techniques" - either word is fine P6264,L25 "the global distribution" P6264,L26 "have been inferred" P6265,L02 "linear theory of internal" P6265,L10-12: repetitive, rephrase P6265,L15-16: sentence confusing, rephrase P6265,L7: "modelling result" -> "model" ? P6266,L13: "The" data used L6266,L16: "modeling system" -> "model"? L6266,L17: no 'the' at the beginning P6266,L25: "point" P6266,L26: "dependence" P6269,L25: repetitive, rephrase

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Interactive comment on Atmos. Chem. Phys. Discuss., 12, 6263, 2012.