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Title: A new paradigm for intensity modification of tropical cyclones: Thermodynamic impact of vertical wind shear on the inflow layer
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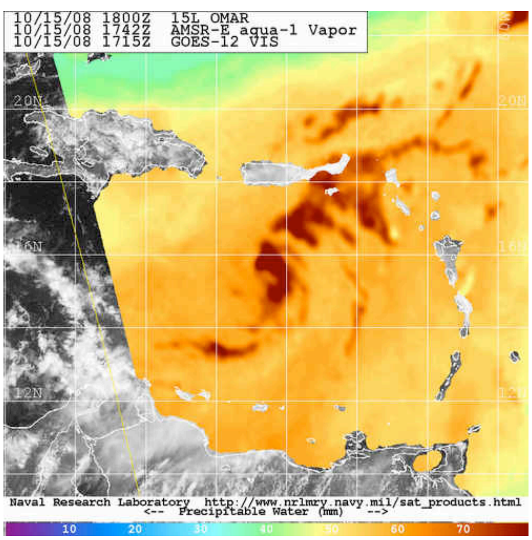
This manuscript investigates TC resiliency under the influence of vertical wind shear and presents a mechanism by which shear can promote the introduction of low theta e air into the boundary layer of the surrounding TC environment. The authors hypothesize that this lower theta e air does not sufficiently modify as it is advected toward the eyewall in the inflow layer and can therefore inhibit the TC heat engine. I found the manuscript to be well-written and the results quite interesting. I am recommending that this manuscript be accepted by ACP after minor revisions.

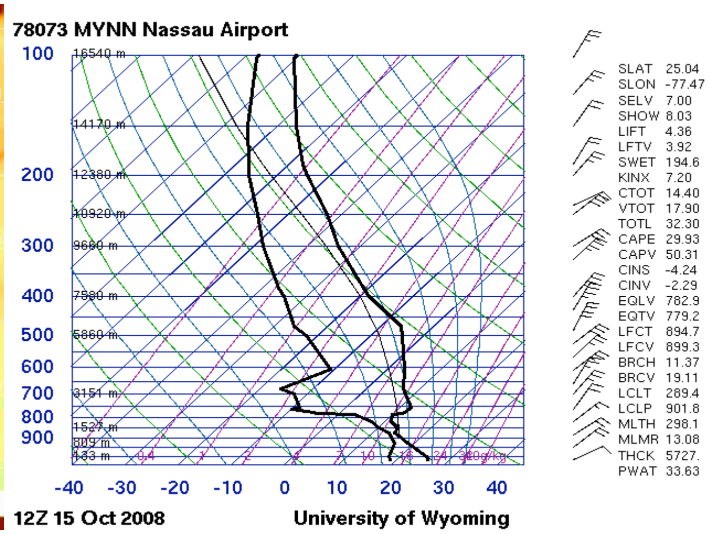
Comments:

1. Page 5, para 2: Please explain this "climatological mid-level minimum" that is being referred to. Certainly, the moist tropical sounding of the North Atlantic doesn't have such a minimum. Please clarify.
2. Page 6, para 2: Re: parcels with reduced theta e rising in the eyewall. What about the mid-level low theta e air that created those low theta e BL parcels? That too could be an inhibitor if it's near the updraft region: first it's dry and second, it's creating localized downdrafts that could disrupt the engine;
3. Page 11, para 1: Re: the use of the Jordan sounding: a few recent studies have suggested that the Jordan sounding may be too dry and not adequately represent what the moist tropical sounding really looks like. Mid-level moisture in Jordan's sounding may be ~15-20% too dry compared to what the moist tropical Atlantic really looks like. See Dunion and Marron (2008);
4. Page 12, para 1: the authors explain the use of 12 km at the height of max wind (~200 hPa), but it is unclear from the text how the ~850 hPa level was selected;
5. Page 12, para 1: Consider adding a 2Um value (or two) in between 0 and -10 m/s. 10 m/s of vertical wind shear is moderate to high and certainly the 15 and 20 m/s shear values are extremely high. Since the average shear in a basin like the NATL is ~15 kt, it might be valuable to include shear values of 5 and 7.5 m/s as well. Since the Jordan sounding was used (and that's a NATL mean sounding), it makes sense to mimic NATL conditions as much as possible;
6. Page 12, para 1: It is unclear why the authors chose to impose easterly shear on their system, even though W or WNW shear is the most common shear direction in the NATL. Of course, westerly shear could be realized in two ways: strong westerlies aloft or strong easterlies near 850 hPa. The former is more typical, but the latter can often occur in the tropical NATL in association with the African easterly jet and Saharan Air Layer;
7. Page 14, para 2: Re: the storm movement: I may have missed this, but is there no environmental steering flow that the vortex is embedded in? Please explain what is meant by "the vertical shear profile implies a steering flow for the TC". Since TCs are largely under the influence of the deep layer mean steering flow, it's not quite clear what is meant here;
8. Page 16, para 2: at this point, the reader may be wondering where the "considerably reduced BL theta e" is coming from. Clearly, it's being advected into the TC circulation

(e.g. Fig 7), but some of those values (particularly the <347 K values) are extremely low. Is that low theta e air the result of a downdraft or is it simply being advected from the outer environment? Of course, this is addressed later, but a teaser may be a nice addition here;

9. Page 16, para 2: It would be helpful to see the temperature and mixing ratio values for these plots (Fig. 7), so that the reader could get a better sense of the relative contributions of temp and moisture to these depressed theta e values;
10. Page 19, para 2: Re: low theta e air being brought down to the BL from above: this makes sense, but Fig. 7 seems to show that the low theta e air in the lowest 1km has its source fairly far from the center in the NW quadrant, particularly in the higher shear cases;
11. Page 32, para 1: Re: the arc clouds NW of Omar: these arc clouds may have in fact been triggered by extremely dry low to middle level air associated with a mid-latitude dry air intrusion positioned just NW of the storm (evident in total precipitable water imagery; TPW values ≤45 mm/green shading). The 15 Oct 2008 12z sounding in Nassau confirmed the extreme dryness of this mid-latitude dry air intrusion, with RH (mixing ratio) values as low as 18% (1.6 g/kg) from 600-800 hPa. One hypothesis to consider is that the enhanced shear promoted the impingement of this mid-level dry air on the TC convection. The subsequent formation of convectively-driven downdrafts could have helped triggered the arc clouds. Just something to consider. For more information, some of these ideas are discussed in NOAA HRD's 2008 Hurricane Field Program Plan (p.50-52): http://www.aoml.noaa.gov/hrd/HFP2008/HFP2008.pdf





12. Page 33, para 2: This idea of reduced BL theta e not recovering sufficiently is interesting, but it would be nice to see some expanded hypotheses here. Certainly, BL theta e doesn't always recover as it is advected into the TC circulation. Things like storm size (i.e. how does the inflow trajectory for that low theta e air parcel vary depending on storm size), vertical wind shear (which can bring that low theta e air into the TC core more efficiently), and the thermodynamic profile of the surrounding environment (Jordan is a less than optimal first guess since the tropical atmosphere actually contains multiple soundings that are quite unique (e.g. moist tropical, Saharan Air Layer and mid-lat dry air intrusions) and not well represented by this single mean sounding);

Figures

Figure 1:

- this is a very long caption. Consider explaining some of the details in the main text and streamlining the caption;
- see minor comment #1;