I think the structure of the intro looks reasonable and only have two comments on that:  
  
Intro: focus on simple volatiles rather than getting into complex organics, since that opens a whole new can worms.  
  
Intro: recent paper by the Bergin group suggests that gas C/O ratio will result in a chemical signature that might be observable (Du, Bergin & Hogerheijde, 2015).  
  
**DONE** Model Assumptions —> Model framework?  
  
**DONE (they were described in previous sections)** 2.4. there are few equation terms that are not explicitly defined for the desorption time scale. Also I think it would could to spend a couple of more sentences on that to explain why that equation makes sense. **Which terms specifically? Rhos, s, Rdes, mu, are already defined in 2.2 and 2.3 – should I restate what they are?**  
  
2.4. the text reads very well, but I think you need to be more explicit about what the results are in Fig. 1, i.e. draw attention to t\_acc is always < t\_d, t\_des< for particles <10cm and t\_drift<t\_d for particles 0.1<s<1000 etc.  
  
**DONE** Fig. 2. reduce the size by ~50%.

Fig.2 Also I think you need to be more explicit on the caption what you mean with final distance as well as the statement 'For the range  
of particle sizes that fully desorb during td = 3 Myr, the desorption distance is the same regardless of the particles' initial location.’, i.e. the latter could be interpreted as all particles that full desorb, desorb at the same radius regardless of size.  
  
**DONE** Fig. 3. I think this figure could be made clearer by color coding the points the same way as Fig. 2. Also I assume that the units are AU rather than cm. Finally be explicit about which cases that it fails for, i.e. the smallest particles. [and let’s think about why when we chat tomorrow]. **Yes, let's chat about it.**  
  
3. For a non-theorist it is always helpful have the equations and boundary conditions restated in words, but do as seems good to you.  
  
3. The paragraph 'As we show in Section 4, a drifting particle that desorbs  
will do so almost instantaneously and will lose most  
of its mass very close to the distance at which it fully  
evaporates. Thus a particle's final location will depend  
on whether a grain initially at a certain distance is completely  
desorbed or not within the disk lifetime of 3 Myr.  
For example, larger grains take longer to desorb and  
hence are more likely to not evaporate fully in a given  
timeframe.’ is confusing I think, especially on its own. The first sentence is probably not needed here, since you deal with that at length later. See if you reword it and also connect it better to Fig. 2, i.e. combine with the next paragraph. You may want to start with sentence along the lines of:  
‘We define the final position of a grain as the disk radius it has reached after 3Myr \*or\* the radius at which it completely desorbs, it that happens at a shorter time scale than 3Myr.’  
  
4. You open with claiming that you showed in section 3 that particles desorb instantaneously, but as far as I can tell in section 3 you point to that you will show this in section 4. is there some section 3 text missing? If not I would wait with these claims until after you have presented Fig. 4, and have Fig. 4 demonstrate them rather than ‘prove’ previous indications.  
  
4. This sentence is confusing I think 'Therefore, a particle that  
can fully desorb during the disk lifetime for at least one  
initial location will always desorb, at a fixed distance as  
discussed in Section 3 and displayed in Figure 2.’ and needs to be reordered to something like ‘A particle that fully desorbs during the disk life time will desorb at a size-specific distance from the star, regardless of its initial location.’ Though you basically say the same in the next sentence so you could probably loose the above sentence completely.  
  
4. I don’t think you need to reproduce the table. if the referee thinks otherwise we can always add it.  
  
4. For the passive disk, only grains larger than  0.5 cm  
drift, desorb and thus form a snowline —> For the passive disk, only grains larger than  0.5 cm drift, desorb and thus move the snowline compared to the static disk.  
  
4. This sounds like a contradiction to the time scale argument above 'However, bodies larger than  7 m will evaporate at the same location as the meter-sized planetesimals.’ and needs some more explanation I think. I presume the explanation is that only km size bodies very close to the snowline will contribute to the setting the snowline location.  
  
4. the large paragraph doesn’t read as smoothly as the rest of the draft and should perhaps be split up into two. **I assume you refer to the second paragraph.**  
  
Fig. 4. suggest that you change the axis from Myr to yr since it is less intuitice what 1e-2 Myrs are than 1e4 yrs I think.  
  
5.1. Edit the sentence 'We perform the simulations at four representative timescales in the  
disk evolution to see how the snowline locations evolve with time and affect the C/O ratio.’ to be more precise, i.e. state that you determine the snowline locations at xx, yy, and zz in the disk model. **Just to clarify, by xx yy zz you mean the timescales, right?** In also think the rest of that paragraph could be written with mode clarity, i.e. make the point explicitly that the only thing that changes with time is how much material has moved through the disk not where the material is desorbing and thus the snow line locations. This also reminds me that somewhere earlier on in the paper we should make clear that we assume that all desorbed gas diffuses quickly to produce a single abundance between snowlines, but that back diffusion is unimportant.  
  
5.1. Do we really expect transition disks will behave the same, i.e. won’t the reduced gas pressure reduce the drift velocity close to the gap edge? **Example plot for s=10 cm shows that things behave the same...**  
  
5.2. I think we need a more positive sub-section title here **Additional Effects? Model Limitations and leave the main section title as Discussion?**  
  
Table 1. Morphology —> grain morphology. In general this table would benefit from having a few more words in each category, i.e. make it a full page width table and more self-sufficient. **I.e., summarizing the text and resulting effect from each category in the text? *Make title shorter: The effects of dynamical and chemical processes on snowline shapes locations, then footnote about what the arrows mean.***  
  
5.2. be more explicit about that particle growth will initially push the snowlines inwards and only once you get to planetesimals will the static snowline be regained.  
  
5.2. it is not clear to be how back-diffusion across the (static) snowline will push the snowline outward. It seems like it would reduce the gas-phase volatile abundance interior to the snowline though. please clarify. **Indeed, I think the more realistic explanation is that back-diffusion will (1) spread out the snowline as opposed to it being sharp, and (2) change the C/O ratio in gas and dust both inside and outside the snowline, due to the reduction of gas-phase volatile abundance interior to the snowline.**  
  
5.2. Add 'disk gaps and holes’ as category? **It looks like disk gaps don't produce any change in our simplified model that does not include diffusion, so perhaps it would be better to add this to the diffusion category? *Say that gaps, holres etc change the drift velocity, slow particles down and therefore push snowlines out***  
  
5.2. Add that if the ices are mixed the desorption energies will be larger for the most volatile species, pushing the snowlines inward.  
  
5.2. Be less specific about the future work on chemistry since we still don’t really know what is possible.