Point-by-point reply to review comments on 'Dynamic changes on Wilkins Ice Shelf during the 2006-2009 retreat derived from satellite observations' by Rankl et al.

The authors want to thank both reviewers for their careful reading of the manuscript. The comments were very useful and helped to improve the manuscript substantially. Large parts of the manuscript have been re-structured following the suggestions given by Ted Scambos. More methodological aspects brought up by Reinhard Drews have been addressed extensively in the revised version of the manuscript. In the following, all comments are addressed specifically and changes in the manuscript indicated. We hope, both reviewers support the changes made in the revised manuscript.

Comments by Ted Scambos:

Using a time-series of InSAR and speckle-tracked radar images of velocity, Rankl et al. present very good detailed study of the events occurring on the Wilkins Ice Shelf spanning the 1990s and through the series of major calvings and disintegrations occurring in 2008 and 2009. The focus of the paper is on ice flow and strain rates as the ice shelf evolves. This analysis of events provide insight into how stresses are transferred within ice shelves, and illustrate the power of good sequential ice velocity data in diagnosing causality for riftings and calvings.

In general, the writing could be tighter. There are some odd constructions for an English first-language reader, although the meaning is clear enough. But some work on the text could probably reduce the length by 10% and make it an easier, more efficient read. In reading it, I was interested by the main data figures (Fig2, 3, and 4) but found the discussion hard to follow because of the detail – all quite accurate, but it seemed to go slowly through this part when it could have been more interesting.
We did restructure the discussion following the reviewer's suggestion below.

My main comment concerns the interpretations of Figure 2 and 3 and 4 – the data look very good, and they provide a clear story – although I see you are cautioning about data quality in slow-moving areas. What is striking is the abrupt shift in the pattern after the calving and disintegrations of Feb-March, and especially after July, 2008 – this shows that the middle section of the ice bridge was an important buttress, and that the last ice bridge whisker was already nearly detached at the northern end (see Fig 5 in Braun et al. 2009 and Fig2 in Scambos et al. 2009 – the connection to Charcot Is. is rifted and sheared prior to the removal of the central ice bridge piece). With the loss of the middle ice bridge section, strong extensional stress is present just north of the Vere ice rise, and the ice soon rifts away ..
Sections 4.1 and 4.2 work through the data in the figures slowly. . . it would be more emphatice and clear to introduce the three figures briefly (just say what they are) and then discuss the evolution of the fractures and strain rates in a more story-like fashion. Readers would retain the events and significance better.

Or perhaps open with a) brief description of the data shown in the figures, and caveats, then, b) an overview 'story' of how events proceeded and the major fractures and shifts in strain patterns, and then c) perhaps some kind of review of the details captured by the Fig3 and 4 data that you are discussing on Page 6 and 7.
We thank the reviewer for this useful suggestion. We followed the reviewer's suggestion to split the discussion into 3 parts. The changes have certainly facilitated the readability of the manuscript and highlight the main results more succinctly.

I think the data make the sudden rearrangement the highlight of the paper; they underscore the relative lack of importance of the easternmost section of the ice bridge (or, if you like, the importance of the middle section.)

Overall, I think the manuscript is nearly publishable as it is, but would benefit and be more likely to be remembered and cited with another round of editing with respect to telling the story more clearly and succinctly. The conclusions have this kind of 'voice'.
The conclusions have been restructured.

P2L1 – in several papers, I've been trying to reserve this word for the kind of fine-scale rapid calving that was observed on Larsen B in January - March 2002 and Wilkins in Feb29-March8 2008. Please use the word 'collapse' here, since the ice shelf instability caused by the loss of the compressive arch might simply result in a series of large-scale calvings spanning months or even years, and not a true 'disintegration'.
We thank the reviewer for this helpful advice. The sentence has been changed accordingly.

P3L13 SNR: This needs a bit of unpacking – what you mean is a correlation peak height that is less than 4 times the mean correlation away from the peak. 'Signal' to 'noise' is a bit obscure here.
The reviewer is right with his explanation here, however, the term signal-to-noise ratio is commonly used when measuring the confidence of the offset estimates derived from intensity offset tracking (Seehaus et al., 2015; Strozzi et al., 2002; Werner et al., 2005). Thus, we would like to keep this terminology.
P5L33-34 Yes, extensional strain, but once the rift had formed in July 2007, almost all of the 'strain' would be taken up by the rift widening. It's what the strain rate was prior to the new rift (which, agreed, would have been formed by the stress build-up).
This remark of the reviewer is very subtle as it refers somehow to the transient stress evolution during fracture opening. Certainly, the stress field evolves as rifts open. This is difficult to trace with displacement fields inferred from consecutive image pairs acquired with a time lag of many days or even months. These displacements are highly averaged, while the rearrangement might have taken place on much shorter time-scales. We added this notion to the text when introducing the results.
P7L3 – '. . .it is obvious . . .. ' this phrase is odd, the block might have just calved away intact?
This ambiguous formulation was removed during rewriting the entire section following the main reviewer comments.
P7L8-25 I find this section somewhat of a difficult read – too tentative, to qualified; there's a basic story from the data, but it's obscured by nuance here. For example, L19-21, the ice bridge has a stabilizing effect, yes, and that places it under compressive strain along its axis, thus leading to, not failing to prevent, its eventual collapse - ?
Also, this paragraph was rewritten more clearly and succinctly during re-organization of the result section.
Fig3 and Fig4 – there is a white (fig3) and red (fig4) dot near the northeastern corner of the ice bridge – what does that signify? Please describe it in the captions.
The red/white dots mark an ice rise at the northeastern corner of the ice bridge. In the revised figures we removed the dots, since this information is not relevant for the analysis.

Please also note the supplement to this comment:
We thank reviewer for his helpful comments. The manuscript has been adapted accordingly.

References:
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Werner, C., Wegmuller, U., Strozzi, T. and Wiesmann, A.: Precision estimation of local offsets between pairs of SAR SLCs and detected SAR images, in Proceedings. 2005 IEEE International Geoscience and Remote Sensing Symposium, 2005. IGARSS'05., vol. 7, pp. 4803–4805, IEEE., 2005.