We are pleased with the generally positive reviewer remarks and thank the reviewer for the invested time and the very helpful comments provided, which will help us to improve the manuscript. A pointwise reply to the reviewer's comment is given below.

Specific Comments:

1.) *I'm not so sure that algorithms to detect jet cores are lacking (as stated in the abstract). There are actually a relatively large number of previously published papers which are based on either a single level/layer or zonal/sectorial mean latitude-pressure fields. The current application of the network-based method is yet another variation of this and so needs to be put in context with other (similar) methods which use single level or mean-layer wind fields (e.g. Koch et al, 2006, Archer & Caldiera 2008, Pena- Ortiz et al 2013). Hence at the risk of expanding the paper too much I think it would be useful to acknowledge some more of the previous work and to compare with the results obtained here (even though they are based on a 15 day mean as opposed to monthly means) and discuss why this method has advantages over the previous studies.*

   We will rephrase as suggested.

2.) *I think 'time step' is a confusing choice of phrase to describe the 15 day means – maybe use 'time period' ?*

   We will rephrase as suggested.

3.) *The simulated annealing actually uses the Rikus algorithm so it is being used as more than just a comparison. (page 1, line 18) and the abstract description should reflect that.*

   We will rephrase as suggested.

4.) *Were the original runs (Fig. 2) done with with the un-optimised weights from table 1? If not what was used?*

   The original runs were done with un-optimised weights from table 1. We will rephrase this part to make it clearer.

5.) *The supplementary plot (S1) is only mentioned in a single sentence without sufficient context to make it worth while. Either add more discussion or remove it?*

   With this plot, we would like to show that our method is able to track also omega-shape pattern, but in principle we agree, it is not necessary in order to present our algorithm and we will remove it.

Technical Corrections.

In general, we agree with the referee and we answer only specific questions raised by the reviewer:

Abstract Line 21: In this case latitudes (and not longitudes) were meant: We present probabilistic, regionally distinct positions for both jets for all seasons. This shows that winter is characterized by two well separated jets at mean latitudes of 20°S and 140°N.

Page 4, lines1,2: This means that the path of the jet stream core is not an injective function. This way, omega-shaped jet stream paths are possible.

Page 4, lines 12-13: The sum of the weights is 1.

Page 7,lines 7-8: Since Rikus' algorithm finds a subtropical jet for almost all time steps, we used at first every 14^{th} of the found subtropical jet stream core for optimization.

Page 8, line 20: We agree with the referee: These differences are due to the undulations explained above.