REVIEWER 1

Most of my main concerns in the previous review have been answered to an acceptable degree.
As I said in my previous review, the analysis of CPs remains a little bit confusing. I do not understand why methods for the identification of multiple change points are important in the analysis presented in this paper and, thus, I would suggest removing the discussion about them in the final version of the text (any mention to results using BinSeg and PELT).

The use of three different CPs methods have two advantages, firstly as the three methods are different the coincidence of the CP detected using AMOC (only one by series) with any of the detected by the other two approaches (multiple CPs by series) reinforces the result reached by AMOC. Secondly, the existence of other CPs (as commented in the text) opens new possible studies on changes of MTP respect to any of the other CPs. So we prefer to maintain the analysis and discussion using the three CPs methods

Some of the corrections and new paragraphs included in the new version of the text are confusing:
The new title makes no sense. Do authors want to emphasize the existence of a pattern in the 'changes in the moisture transport…', or the existence of changes in 'the pattern of moisture transport for precipitation ASSOCIATED with Arctic sea ice melting'? I guess it is the second one. Could the new title be something like: 'Changes in the long-term pattern of moisture transport for precipitation associated with Arctic sea ice melting'

We have changed again the title. The new one is" A new pattern of the moisture transport for precipitation related to the Arctic sea ice extent drastic decline" as suggested by the reviewer 2

Abstract, same question as before: 'We have identified the patterns of change in…' or 'We have identified changes in the patterns of…'? Changed
The new version of the first paragraph in section 2.2.2 is very confusing: review

Changed, now is written so:

"We have used several methods to estimate change points in Arctic sea ice (ASI) extension. As usual in time series analysis a change point detection tries to identify times when the time series in mean or variance changed, in this case we were interested mainly in changes in mean. Changes in mean for the Arctic sea ice extension is equivalent to a decrease, higher ASI extension values before the change point and lower after it".

The paragraph beginning in page 9, line 4 is confusing and should be reviewed…

Changed. We have removed the term "is consistent" by implies and we have written the most frequent type of precipitation by season, snowfall, rainfall… into brackets. We think that now it is less confusing

Conclusions (page 12 line 4): Same question as in the title: 'The pattern of change' or 'a change of the pattern'? I find it is the pattern of MTP what changes. It is difficult to talk about a pattern of change from a single change point and thus, a single change case.

Changed

Some suggestions:
P5L1: the three different change point DETECTION methods Done
P6L2: ...the defined as the major moisture sources... -> ...those defined as major moisture sources... Done
P6L8: ...including the particles coming from the own Arctic region -> ...including the particles coming from the Arctic region itself Done
P6L10: ...2005), THIS works ... -> ...2005), it works... Done
P6L13: ...big enough -> ...high enough Done
P8L32: (red crosses) -> (red asterisks) Done
P12L3: ...which then results in precipitation over the Arctic (MTP) -> ...which then results in changes in the precipitation over the Arctic Done

2nd round revision of the manuscript submitted to ESD by Luis Gimeno-Sotelo, Raquel Nieto, Marta Vázquez, Luis Gimeno I thank the authors for addressing my previous major comments. The revised article text better explains the results and I recommend it for publication after taking into account some minor comments below.

Title: Thank you for changing the title - however, I find the new title "The pattern of long-term changes in the moisture transport for precipitation with Arctic sea ice melting" still confusing. My suggestion would be something like this: "A new pattern of the moisture transport for precipitation related to the Arctic sea ice extent drastic decline" to better highlight the importance of the results in connection to the 2003 sea ice extent decline. But if the Editor agrees with the current title - I leave this to the authors to decide if they want to modify it.

We have changed again the title. The new one is" A new pattern of the moisture transport for precipitation related to the Arctic sea ice extent drastic decline" as suggested by the reviewer

Abstract:

1st sentence "In this study we use the term moisture transport for precipitation (MTP) for a target region as the moisture coming to this region from its major moisture sources that then results in precipitation over it." => "... resulting in precipitation over the target region". Please use the abbreviation MTP after introducing it.

Changed

"The pattern is not only statistically significant but also consistent with Eulerian fluxes diagnosis, changes in the frequency of circulation types" => I suggest changing to "The pattern is statistically significant and consistent with changes in the vertically integrated moisture fluxes and frequency of circulation types." It will make the abstract stronger if the authors add a sentence briefly specifying what are these consistent changes in the IVT and circulation types.

Changed

Please remove the statement "and any of the known mechanisms of the effects of the increments of precipitation as snowfall or rainfall on ice in the Arctic." - this sounds very vague, encompassing too many complex processes and feedbacks, and not the result of the present study.

Removed

Page 2:

The authors introduce two different abbreviations for the same term - "Arctic sea ice extension (SIE)" on page 2 and "Arctic sea ice (ASI) extension" on Page 4. I suggest to change "extension" to "extent" and use one abbreviation - Arctic SIE.

Done. We have changed ASI extension to Arctic SIE and extension to extent

Page 5:

"defined in point 2.2.1." => section 2.2.1 "As in the previous one, there are two horizontal lines, which correspond to the mean of the data before and after the AMOC change point (the 286th month of the series, that is - October 2003). Those means are 0.41 and -0.74, respectively."

 => please say specifically "to the SIE mean" instead of just "mean of the data"..

"Those means are 0.27 and - 0.91, respectively" and "those means are 0.41 and -0.74, respectively " - what are the units? I suppose million sq km if this is sea ice extent? Please check throughout the article text that the units are defined everywhere.

Figure 2:

1) Units are missing.. The yaxis title has to be more meaningful, i.e. "Sea ice extent monthly (daily) anomalies, units". That it is based on 37 years - this is additional information that has to be moved to the caption. The number of data points is redundant information (obvious from the plot).

2) xaxis: Please add a second y-axis on top indicating years; I suggest also changing "Day" -> "Days since..." and "Months since..."

3) Please make the red line thicker - together with years indicated on the top y-axis it should clearly show that it corresponds to 2003

Comment on teleconnection patterns:

There is no need to explain what the term "teleconnection pattern" means - neither to me nor to the readers of ESD. I invited the authors to explain the specific patterns discussed in their study.