Thanks to ***Christian Haas*** for his time providing very constructive comments on our ms, especially pointing out the increasing importance of continental run-off. Our response follows, one by one, the list of the reviewer's comments.

**Abstract:**
Here and elsewhere, it is confusing how many cruises have been used for which purpose to derive the presented results. The abstract mentions five cruises, while Table1 lists 11, and the text uses some of these in a virtually arbitrary order.
***Authors:*** *Our analysis focuses on three winter cruises and two summer cruises following the last (2006) winter cruise. Additional stations are only considered to support our findings, especially with regard to the tracer observations. To reduce the obvious confusion we restructured Table 1, listing the five 'important' cruises first, followed by the six supporting cruises. In addition, we changed the station labels, now representing season/year rather than the official cruise name.*

**Line 10 ff:** Here and elsewhere, your discussion of the causes for freshening or reduced salinification are confusing. It would be nice to formulate the contributions of ice shelf melt, sea ice melt and retreat, and reduced winter formation of sea ice (?) more clearly. This is also related to a more careful discussion of the involved regions and processes suggested below.
***Authors:*** *This suggestion is valid but difficult to accomplish, because we cannot explicitly nail down the cause for the freshening. Therefore, we offer a variety of possibilities not missing to state what we assume to be most likely. We are certain that further investigation and future cruises to the northwestern Weddell Sea will shed more light on the area's complicated freshwater balance The modified abstract now includes the continental run-off, obtained from the regional atmosphere model (RACMO2), as an additional possible cause for the freshening (see also below).*

**Introduction:**
It would be nice if the introduction could more carefully distinguish between different processes in different regions, and ideally only focus on the northeastern tip of the Antarctic Peninsula. The importance of different sea ice processes (freshening due to increased melt and reduced sea ice formation in the northwestern Weddell Sea proper, reduced freshening due to increased ice formation in Larsen polynyas) should be introduced more clearly, e.g. by extending the relevant paragraphs.
***Authors:*** *The introduction has been modified, but in order to demonstrate that the observed change is quite common on the Antarctic continental shelf and not only restricted to the Pacific sector of the Southern Ocean we still prefer to keep a more general Southern Ocean view. In addition, Referee#1 emphasizes that this paper "could reveal an Antarctic circumpolar pattern of water mass changes".*

**P. 2015, l16-23:** similarly, be more specific what you mean and which region/location you discuss.
***Authors:*** *This part of the Introduction has been intensively re-written.*

**P. 2016, l7:** two summer cruises, or three or more (e.g. with Ant X-7?); at some stage you could introduce cruises as primary cruises and additional/secondary cruises, to distinguish more clearly.
***Authors:*** *We followed the advice by distinguishing between the main cruises we used for our analysis (5) and those used as supplement (6), also documented in our new Table 1.*

**Data and methods:**
In general, the paper would become much more readable if you would not use cruise names but clear acronyms for each cruise, e.g. W, S, F with the respective years (e.g. W97) for winter, summer, and fall cruises, and identify them through Table 1. ANTXXIII/ 7 (p. 2017, l4) does not mean anything with regard to summer or winter cruise (nor does ISPOL and WWOS, unfortunately. . .). Not everybody is familiar with the naming conventions of most cruises.
***Authors:*** *See previous reply.*

**P. 2018, l8-19:** This should be moved to the introduction
***Authors:*** *Only part of it has been moved to the Introduction. Most of it was deleted.*

**L10:** entERs
***Authors:*** *Not appropriate anymore.*

**L12-13:** can you explain the underlying reason/mechanism?
***Authors:*** *Though not appropriate anymore: Air bubbles are captured in the ice by the compaction of snow and firn. At a melting ice shelf base, i.e. at high pressure, helium-4 is completely dissolved in the melt water, causing a supersaturation of up to 1400%. Therefore, even small amounts of glacial melt (~0.07 %) are detectable in water masses which contain products of basal melting.*

**L 18:** determination
***Authors:*** *Not appropriate anymore.*

**Observations and methods:**
**P2019, l15-17:** what was the mean GMW fraction?
***Authors:*** *The mean GMW fraction is 0.25% with a standard deviation of 0.07%. For the mean, GMW fractions increase by 0.1% from the surface to the bottom at 450 m.*

**L19-21:** Over what depths were these values determined? ; what does “higher sampled austral summer” mean?
***Authors:*** *The maximum temperature difference of 0.75 °C occurs in the bottom layer ( Fig. 6). However, Figure 6 also shows that a difference of ~0.5 °C exists for the whole water column. "Higher sampled" simply means more hydrographic stations on the continental shelf - changed to "denser sampled".*

**L24-25:** where exactly are those regions? North of 64.5?
***Authors:*** *Stations AS_07-728 and AS_09-28 are both on the continental shelf north of 64.5 (see Fig. 1a).*

**L29-1:** interesting that you found high salinities. Maybe you could contrast them more clearly with the general freshening trend?
***Authors:*** *This is more of an misunderstanding because of us using the terms "lower" and "saltier" (changed to "low" and "salty"). In a stable water column the highest salinity is found near the bottom. But it is the essence of this paper that the salinity of the bottom layer in concert with the whole shelf water column of the northwestern Weddell Sea decreases.*

**Discussion - Summer:**
**P2020, l16-19:** at what depths?
***Authors:*** *That particular mooring (AWI_207) was deployed in 2510-m deep water 50 m above the bottom. The similar behavior of the mooring's temperature and salinity data (seasonal signal + freshening) indicates a link to shelf water masses, which are pushed from the continental shelf as the water of Bransfield Strait origin advances southward.*

**L26:** why should there be enhanced storm activity?
***Authors:*** *This statement is based on the analysis of long-term mean SLP from the NCEP re-analysis products (NOAA, 2009).*

**P2021, l10-11:** This is not very obvious from Figure 7?
***Authors:*** *Same as reply to* ***P9-L8-11:*** *We agree and, therefore, the sentence was modified such that the 'systematic increase' was replaced by a more general statement on higher surface saturation to the north due to a less dense sea ice cover.*

**Discussion - Winter:**
**P2022:** include discussion of surface melt and runoff!
***Authors:*** *Done - thanks for the hint!*

**L26:** replace ANT-X/7 by S92 and move reference into Table 1
***Authors:*** *See reply to similar comments and modified Table 1.*

**P2023, L13:** but none of these papers discusses flow on the shelf, do they? How about possible counter-currents on the shelf?
***Authors:*** *Only the numerical model results of Hellmer et al. (2009) show a general northward flow of shelf water on the western Weddell Sea continental shelf. The two publications on the drift of sea ice and icebergs indirectly indicate a mean northward flow, at which the most western icebergs, tagged in January 2002, drifted on the continental shelf (Schodlok et al. 2006). Their tracks show meanders which, however, might have been predominantly caused by winds. As new bathymetric data becomes available, showing ridges and troughs, it cannot be excluded that re-circulations also exist on the western Weddell Sea continental shelf. However, this aspect is discussed in the same paragraph.*

**P2023 bottom to P2024 top:** this paragraph is confusing because it discusses salinity decreases and increases, and jumps between the northeastern Peninsula Shelf and the Larsen C much further south. Could you rewrite more carefully?
***Authors:*** *We are afraid there are not many possibilities for further clarification, because we clearly state that in order to pin down the causes for the observed freshening one has to check the characteristics of the inflow to the western Weddell Sea continental shelf - e.g., if the southern inflow is saltier than the shelf water at the tip of the peninsula, the observed salinity decrease could be solely caused by the input of additional freshwater. The western stations of the only cross-shelf section available, however, show lower salinities than those at the tip (Fig.8) . Therefore, we conclude that shelf water gains salt on the western continental shelf as it moves northward, and the observed freshening at the tip is caused by a decrease in salinification.*

**P2024, l7 ff:** how is summer defined with these satellite data?
***Authors:*** *We used the month of March (see figure caption).*

**Figure 9:** As this is critical for parts of the discussion of the paper, Figure 9 should focus on the study region, such that differences between different years can be better seen (I think they are not very clearly visible in this figure yet). Also, it may be good to combine both panels into one (overlying colors for one period with isolines for the other) to better show differences between both.
***Authors:*** *This request is realized by adding a difference plot to Figure 9 which (now) clearly shows changes in sea ice concentration of up to 50% in the study area.*

**L12-17:** Maybe this discussion should be extended because the situation is complicated by advection. A southward ice edge may introduce more freshwater, but the larger open water region could then also lead to more ice formation and salt rejection in the following fall. Why should freshening hamper ice formation (line 16?). Also the processes in the polynyas are different from the situation in the “deep” Weddell Sea.
***Authors:*** *We improved this part of the Discussion, because we accept the referee's criticism that sea ice retreat is a spring/summer phenomenon with minor influence on the water column in winter. A fresher surface layer, indeed, supports a thicker sea ice cover because it stabilizes the water column and thus hampers the mixing of warmer waters (WDW derivatives) from the bottom to the surface where this water would melt sea ice. However, if sea ice formation (and brine rejection) on the shelf is not intense enough, assumed to occur under warmer conditions, to get over the stronger seasonal pyconcline, the salt input to the bottom layer in winter is reduced. This argument is added to the Discussion. In addition, we already mention in the Introduction that the coastal polynyas are located over relative deep basins thus retaining salty (= dense) shelf water. The coastal polynya processes might influence the wider shelf water density only once the basins are filled.*

**P2024, bottom:** Interesting discussion. But this example may not apply if water is replaced in less than one year as suggested further above?
***Authors:*** *Because of the short residence time (< 1 year) we calculated the freshening of the shelf water column not only for the mean precipitation but also for the peaks which accidentally occur in the year of (1989) or one year prior to (1996) the observations.*

**P2025:** So what do you mean to say? Can precipitation changes explain your observations or not? Please summarize better how this affects you conclusions?
***Authors:*** *As already written above, we cannot explicitly nail down the cause for the freshening. Therefore, we offer a variety of possibilities not missing to state what we assume to be most likely. We are certain that further investigation and future cruises to the northwestern Weddell Sea will shed more light on the area's complicated freshwater balance The discussion now considers the continental run-off, obtained from the regional atmosphere model (RACMO2), as an additional possible cause for the freshening.*

**Figure 1:** Did you use different colors for different depths in both panels? Add color scale. Numbers are very small.
***Authors:*** *The colors representing depth are the same in both figures. Since adding a color scale is very difficult, because ODV does not provide it, we now put labels on the isobaths.*

**Figure 5:** why are GMW fractions increasing with depth?
***Authors:*** *GMW fractions increase slightly with depth (~0.1% on 450 m), because (see also Fig. 4) higher Ne content (= more GMW) is related to higher salinity, i.e. higher density. This is not quite intuitive, since one would expect GMW to be relatively fresh, but one has to keep in mind that melting beneath ice shelves 'only' adds a small fraction of*

*freshwater to the salty shelf water fueling the sub-ice shelf circulation. The GMW decrease towards the surface might be related to mixing with GMW-low waters higher up in the water column.*

**Figure 6:** include as third panel in Figure 3 and show with same scale for better comparability?
***Authors:*** *We decided not to follow this suggestion because a comparison between summer and winter Θ/S characteristics on the northwestern Weddell Sea continental shelf is not the main purpose of the paper. Figure 6 primarily serves for documenting (1) the 'thermal front' related to a southward advance of Bransfield Strait waters and (2) the small shelf water residence time of less than one year at the tip of the peninsula, due to the replacement of BS waters by southern shelf waters in fall and vice versa in spring. The same salinity scale in Figures 3 and 6 would leave a lot of empty space to the left in Figure 3.*

**Figure 9:** Would be nice to combine both panels for better comparability and to focus on NW Weddell (see above).
***Authors:*** *See reply above (**P2024, l7 ff**).*