| WMO_ID           | Deployment | Float_ | CTD_serial | Program | Cycle at which | Date of DMQC:  |
|------------------|------------|--------|------------|---------|----------------|--|
|                  | date       | type   | no         |         | malfunction    | Correction, concerns   |
|                  |            |        |            |         | started        |  |
| 1901355†         | 15.10.2012 | APEX   | 41CP 5951  | BSH     | ~72            | DMQC at 24.09.2018: Dead at cycle 79, no correction after cycle 71                 |
|                  |            |        |            |         |                | applied because of fast deterioration.   |
| 1901360†         | 23.06.2014 | APEX   | 41CP 6428  | BSH     | 50             | DMQC at 15.07.2018: Dead at cycle 108. Cycles 1-49 with offset                     |
|                  |            |        |            |         |                | correction of -0.007 and afterwards linear correction, maximum at end              |
|                  |            |        |            |         |                | -0.0323  |
| 1901362†         | 23.06.2014 | APEX   | 41CP 6430  | BSH     | 1              | DMQC at 15.06.2017: Early death float, dead at cycle 18. Drifts from               |
|                  |            |        |            |         |                | start, corrected linear trend which reaches -0.0738 at cycle 18.                   |
| 3901089†         | 27.10.2015 | ARVOR  | 41CP 6789  | BSH     | 51             | DMQC at 09.03.2020: Fast drift starts at cycle 52, but is nearly linear.           |
|                  |            |        |            |         |                | Corrections reach -0.0399 in the last cycle (139).                                 |
| 3901590 <b>†</b> | 22.08.2016 | APEX   | 41CP 7838  | BSH     | 84             | DMQC at 05.06.2019: Fast deterioration after cycle 84, corrections have            |
|                  |            |        |            |         |                | not been applied because of fast increase and non-linear behavior.                 |
|                  |            |        |            |         |                | Symptoms of malfunction in cycles 60-63, which have been flagged as                |
|                  |            |        |            |         |                | bad.   |
| 3901608          | 31.12.2016 | Arvor  | 41CP 8611  | BSH     | 82             | <b>DMQC at 09.03.2020:</b> Reference data situation is not ideal along the ACC.    |
|                  |            |        |            |         |                | Corrections have been applied starting at cycle 82 with -0.003 and have            |
|                  |            |        |            |         |                | increased to -0.0351 in cycle 116. Seem to have levelled of after cycle 96.        |
| 3901609          | 03.05.2017 | Arvor  | 41CP-8613  | BSH     | 50             | DMQC at 09.03.2020: fast salty starts in cycle 51 and drift is so rapid that       |
|                  |            |        |            |         |                | no correction is possible. Cycles 1-50 received no corrections. For c aycle        |
|                  |            |        |            |         |                | 76 corrections are already larger than -0.2 and all cycles afterwards are          |
|                  |            |        |            |         |                | flagged as '4'. Shallow reference levels have been selected since deep             |
|                  |            |        |            |         |                | levels never work in the Zapiola eddy. Individual corrections are                  |
|                  |            |        |            |         |                | therefore fluctuating with high variability and signs of malfunction earlier       |
|                  |            |        |            |         |                | are hard to detect.  |
| 3901611          | 29.05.2016 | Arvor  | 41CP-8616  | BSH     | 64             | <b>DMQC 11.03.2020</b> : Fresh drifter with catastrophic failure at cycle 64. This |
|                  |            |        |            |         |                | failure mode is resulting in rapid fresh drift but might be related.               |
| 3901628          | 14.06.2017 | Arvor  | 41CP 9461  | BSH     | 58             | DMQC at 09.03.2020: fast salty drift develops after cycle 57 and makes             |
|                  |            |        |            |         |                | several jumps with even larger corrections. No correction applied from             |
|                  |            |        |            |         |                | cycle 58 onward.   |
| 3901636          | 02.09.2017 | Arvor  | 41CP 9518  | BSH     | 1              | DMQC at 06.02.2020: Completely nasty behavior with drift right from                |
|                  |            |        |            |         |                | the start, up and downs in correction. Impossible to correct.                      |

| 3901652 | 05.03.2018 | Arvor | 41CP 9999 | BSH       | 63    | DMQC at 20.02.2020: Rapid deterioration after cycle 63, correction           |
|---------|------------|-------|-----------|-----------|-------|--|
|         |            |       |           |           |       | impossible. Corrections exceed -0.3 at cycle 74                              |
| 3901656 | 26.01.2018 | Arvor | 41CP      | BSH       | 41    | DMQC at 09.10.2019: Strong drift after cycle 41. Linear fit corrected.       |
|         |            |       | 10055     |           |       | Corrections have already reached -0.0494 at cycle 62.                        |
| 3901657 | 25.01.2017 | Arvor | 41CP      | BSH       | 26    | DMQC at 09.03.2020: Very early fast salty drift start. Drift looks linear    |
|         |            |       | 10016     |           |       | after cycle 23 until cycle 55, but reaches correctability limits long before |
|         |            |       |           |           |       | and then ups and downs in corrections are indicated. All data after 23       |
|         |            |       |           |           |       | flagged as bad.  |
| 3901841 | 31.07.2016 | Arvor | 41CP 8054 | BSH MOCCA | ~64   | DMQC at 01.03.2020: No correction applied for cycles 1-64, afterwards        |
|         |            |       |           |           |       | abrupt jump and fast salty drift which looks linear. Drift corrections       |
|         |            |       |           |           |       | exceed -0.0781 in cycle 129, PSAL_ADJUSTED error has been increased.         |
| 3901859 | 01.09.2016 | Arvor | 41CP 8097 | MOCCA     | 67    | DMQC at 18.02.2020: Fast salty drift sets in abruptly after cycle 66, is too |
|         |            |       |           |           |       | large to be corrected. All cycles afterward are flagged as bad. After cycle  |
|         |            |       |           |           |       | 95 PSAL_QC has been set to 4 and salinities jump to fresh values             |
|         |            |       |           |           |       | abruptly. Due to limited reference data base shallow reference levels        |
|         |            |       |           |           |       | with water masses continuous through the passages had been selected          |
|         |            |       |           |           |       | for cycles 1-66. Altimeter comparison shows these cycles to be in good       |
|         |            |       |           |           |       | agreement and therefore no offset has been applied. The                      |
|         |            |       |           |           |       | PSAL_ADJUSTED_ERROR has been increased.                                      |
| 3901867 | 12.10.2016 | Arvor | 41CP 8105 | MOCCA     | ~70   | DMQC at 02.03.2020: First 69 cycles are ok, then rapid linear salty drift    |
|         |            |       |           |           |       | follows until cycle 86, which exceeds -0.05. Followed by jumps to low        |
|         |            |       |           |           |       | salinities. All data after 69 flagged as bad.                                |
| 3901869 | 10.11.2016 | Arvor | 41CP 8122 | MOCCA     | ~74,  | DMQC at 13.02.2020: No correction for cycles 1-73, followed by a             |
|         |            |       |           |           |       | moderate linear salty drift afterwards which reaches -0.0181 in cycle 107.   |
|         |            |       |           |           |       | The following deterioration is too large and cannot be corrected             |
| 3901868 | 11.10.2016 | Arvor | 41CP 8116 | MOCCA     | 1     | DMQC at 18.02.2020: Drift behavior from beginning. Linear drift              |
|         |            |       |           |           |       | assumed which reaches -0.0327 in cycle 122.                                  |
| 3901872 | 23.08.2016 | Arvor | 41CP 8125 | MOCCA     | ~78?? | DMQC at 28.02.2020: Unclear behavior shows fast salty drift after cycle      |
|         |            |       |           |           |       | 78 with maximum correction >-0.05 and back to good behavior. For the         |
|         |            |       |           |           |       | moment all data after 78 flagged as bad.                                     |
| 3901873 | 04.09.2016 | Arvor | 41CP 8126 | MOCCA     | ~88   | DMQC at 12.02.2020: Fast salty drift which exceeds correctability limits     |
|         |            |       |           |           |       | after cycle 111 when it accelerates. Salty drift starts with a moderate      |
|         |            |       |           |           |       | linear drift between cycles 88-110 where it reached -0.0210, this has        |

|          |            |       |            |       |                | been corrected.   |
|----------|------------|-------|------------|-------|----------------|---|
| 3901896  | 24.04.2017 | Arvor | 41CP 8265  | MOCCA | 1              | DMQC at 13.02.2020: Continuous drift from start which reach                       |
|          |            |       |            |       |                | corrections of -0.0175 in cycle 73. Large jump afterwards not correctable.        |
| 3901897  | 10.05.2017 | Arvor | 41CP 8266  | MOCCA | 57 and earlier | DMQC at 14.02.2020: Very confusing example. Strong indications of                 |
|          |            |       |            |       |                | depth dependent drift behavior. Consensus among dmqc-operators not                |
|          |            |       |            |       |                | to use data below 1000 dbar and no data after cycle 69. In last                   |
|          |            |       |            |       |                | submission all data from this float have been flagged as bad.                     |
| 3901898  | 10.05.2017 | Arvor | 41CP 8267  | MOCCA | 45             | DMQC at 18.02.2020: Catastrophic drift after cycle 45. Jumps from                 |
|          |            |       |            |       |                | extremely high to extremly low salinities later.                                  |
| 3901909  | 29.12.2016 | Arvor | 41CP 8283  | MOCCA | 46             | DMQC at 28.02.2020: Unclear behavior and difficult to evaluate because            |
|          |            |       |            |       |                | of the high variability in the Mediterrean outflow. Cycles 1-46 have not          |
|          |            |       |            |       |                | been corrected, all data afterwards are flagged as bad. After cycle 88            |
|          |            |       |            |       |                | PSAL_QC has been set to '4' and lately jumps to very fresh salinities             |
|          |            |       |            |       |                | occurred. The float drifted on the shelf and no reference data would be           |
|          |            |       |            |       |                | available.  |
| 3901946  | 23.01.2018 | Arvor | 41CP 8515  | MOCCA | 27             | DMQC at 11.02.2020: Unclear behavior, at last dmqc signs for fast salty           |
|          |            |       |            |       |                | drift after cycle 27. But with longer time series hope for recovery at end        |
|          |            |       |            |       |                | of available time series. Unclear what caused behavior in cycles 27-69.           |
|          |            | -     |            |       |                | Float remains on greylist.  |
| 3901952  | 20.09.2017 | Arvor | 41CP 8555  | MOCCA | 49             | DMQC at 14.02.2020: Fast salty drifter with signs of depth dependent              |
|          |            |       |            |       |                | drift behavior. At last dmqc reference levels in the central waters had           |
|          |            |       |            |       |                | indicated that drift started around cycle 49 and first cycles were fine. The      |
|          |            |       |            |       |                | float was put on greylist. Altimeter comparisons show that linear drift           |
|          |            |       |            |       |                | corrections for cycles 50-71 improved comparison, but also show                   |
|          |            |       |            |       |                | mismatch in the uncorrected early cycles. With reference levels in the            |
|          |            |       |            |       |                | deep water the corrections do show different temporal behavior. All data          |
|          |            |       |            |       |                | have been flagged as bad for now.   |
| 3901953  | 05.10.2017 | Arvor | 41CP 8608  | MOCCA | 20             | DMQC at 18.02.2020: Only the first 20 cycles are probably ok, afterwards          |
|          |            |       |            |       |                | extremely large salty drift which goes up and down and exceeds                    |
| 2004070  | 06.02.2010 |       | 44 65 0747 |       | 400            | correctably limits soon. Corrections are as large as -0.3 at cycle 90.            |
| 3901979  | 06.02.2018 | Arvor | 41CP 8/4/  |       | 108            | Divige at 28.02.2020: Big jump after cycle 108, data are not correctable          |
| 4901428† | 20.10.2015 | Arvor | 41CP 6742  | RSH   | 1              | <b>DIVICE at 10.03.2020:</b> Drift from start, linear in appearance with break at |
|          |            |       |            |       |                | cycle 39. Corrections at last cycle are as great as -0.0396.                      |

| 4901429† | 21.10.2015 | Arvor | 41CP 6785 | BSH         | 98             | <b>DMQC at 10.02.2020:</b> Very non-linear behavior with large jumps at cycle 99 and initial recovery with smaller subsequent drift. All data after cycle 98 are flagged as bad.   |
|----------|------------|-------|-----------|-------------|----------------|--|
| 4901682† | 23.10.2015 | Arvor | 41CP 6787 | BSH         | 45             | <b>DMQC at 26.02.2020</b> : fast salty drift starts at cycle 45 and accelerates after cycle 110 to extremely large levels up to -0.4. All data after cycle 45 have been flagged as bad, potentially cycles 46-110 could be corrected.  |
| 4901683† | 24.10.2015 | Arvor | 41CP 6788 | BSH         | 21             | <b>DMQC at 26.02.2020:</b> Only cycles 1-21 are ok, afterwards the fast salty drift is going up and down and is very non-linear. At the end a jump to very fresh occurs.   |
| 6901908† | 11.06.2014 | APEX  | 41CP 6416 | BSH         | 1              | <b>DMQC at 15.07.2018:</b> Moderate rates of fast salty drift, but right from start detectable in the Nordic Seas because of low variability. Corrections applied to all cycles, is -0.017 at end  |
| 6901978  | 22.10.2014 | APEX  | 41CP 6625 | Netherlands | 36 or later    | <b>DMQC at 10.03.2020:</b> Horrible combination of drift along the Argentinian shelf, Zapiola eddy and ACC, all areas with high variability and few reference data. Additionally the float measures deep only every forth cycle. Seabird has also looked at the data and confirmed all data after cycle 100 to be bad. Hooks at the base of the mixed layer could also indicate a slow pump. Drift is non-linear with ups and downs, and the abrupt offset between 37 and 85 is limited in confidence by proximity to shelf and few reference data. Only data from cycles 1-36 should be kept. |
| 6902016† | 20.05.2014 | APEX  | 41CP 6552 | Finland     | 100            | <b>DMQC at 11.03.2020</b> : shows moderate salty drifts starting with cycle 100. Corrections at end reach -0.0125  |
| 6902554† | 23.06.2014 | Arvor | 41CP 6009 | BSH         | 80 or earlier? | <b>DMQC at 10.03.2020:</b> Confusing results, definitely a fast salty drifter. But corrections show different behavior in early part dependent of chosen reference level depth. But also an area with relatively high eddy variability. Similar corrections in later part of time series for both shallow and deep levels of reference bit different behavior at beginning. For safety reasons all data flagged as bad.  |
| 6902565† | 25.09.2014 | APEX  | 41CP 6597 | BSH         | 122            | <b>DMQC at 09.07.2019:</b> Definitely a fast salty drifter after cycle 121 and because of the up and down in corrections no correction has been applied and all data have been flagged as bad. The offset correction for cycles 60-121 slightly increases comparison with altimetry.   |
| 6902567† | 04.10.2014 | APEX  | 41CP 6608 | BSH         | 25             | DMQC at 09.07.2019: Fast salty starts in cycle 26 and reaches -0.0314 at   |

|          |            |       |           |     |                  | the end with linear behavior.   |
|----------|------------|-------|-----------|-----|------------------|---|
| 6902573† | 11.01.2015 | APEX  | 41CP 6617 | BSH | 50               | DMQC at 05.07.2019: fast salty drifts apparent afte cycle 50, reaches -     |
|          |            |       |           |     |                  | 0.0186 at the end with linear behavior.                                     |
| 6902574† | 09.01.2015 | APEX  | 41CP 6621 | BSH | 112              | DMQC at 05.07.2019: Evidence for fast salty drift after cycle 112, but also |
|          |            |       |           |     |                  | fewer reference data close to the coast. All cycles after 112 have been     |
|          |            |       |           |     |                  | flagged as bad.   |
| 6902575† | 04.01.2015 | APEX  | 41CP 6622 | BSH | 25               | DMQC at 05.07.2019: fast salty drift starts early in cycle 26 and shows     |
|          |            |       |           |     |                  | some moderate ups and downs in the last cycles. Cycles 26-126 have          |
|          |            |       |           |     |                  | been corrected and corrections in cycle 126 are as large as -0.0147. the    |
|          |            |       |           |     |                  | remaining cycles afterward have been flagged as bad because of the          |
|          |            |       |           |     |                  | decreasing corrections.   |
| 6902584† | 09.09.2014 | NOVA  | 41CP 6262 | BSH | ~40              | DMQC at 11.11.2018: All data after cycle 62 have been flagged as bad,       |
|          |            |       |           |     |                  | when drift accelerates and too few reference data are available for         |
|          |            |       |           |     |                  | robust definition of trend.   |
| 6902604† | 15.03.2015 | Arvor | 41CP 6224 | BSH | Offset or drift? | DMQC at 05.07.2019: has been corrected by a simple offset (-0.0101)         |
|          |            |       |           |     |                  | because few reference data.   |
| 6902612† | 06.05.2015 | NOVA  | 41CP7073  | BSH | 1                | DMQC at 11.11.2018: Corrected fast continuos drift until cycle 81 where     |
|          |            |       |           |     |                  | it reached -0.0157. The large increase after cycle 81 could not be          |
|          |            |       |           |     |                  | corrected.  |
| 6902621† | 11.04.2015 | Arvor | 41CP 6373 | BSH | 1 all bad        | DMQC at 03.07.2019: too large drift to attempt correction. Jumps fresh      |
|          |            |       |           |     |                  | at the end.   |
| 6902623† | 12.04.2015 | Arvor | 41CP 6377 | BSH | 121              | DMQC at 03.07.2019: fast salty drift starts abruptly at cycle 121, all      |
|          |            |       |           |     |                  | following cycles until 132 flagged as bad.                                  |
| 6902624† | 12.04.2015 | Arvor | 41CP 6378 | BSH | 54               | DMQC at 10.03.2020: Fails relatively abruptly after cycle 54 with           |
|          |            |       |           |     |                  | corrections at maximum larger than 1 psu, pretends to miracously            |
|          |            |       |           |     |                  | recover at end  |
| 6902626† | 13.04.2015 | Arvor | 41CP 6380 | BSH | 1 all bad        | DMQC at 30.07.2018: No correction possible, all data flagged bad. Jumps     |
|          |            |       |           |     |                  | fresh at end  |
| 6902627† | 26.06.2015 | Arvor | 41Cp 6371 | BSH | 1                | DMQC at 08.07.2019: Drift increases rapidly after cycle 80 and all          |
|          |            |       |           |     |                  | subsequent data are flagged as bad. New assessment of corrections with      |
|          |            |       |           |     |                  | better reference data is underway.  |
| 6902632† | 26.09.2015 | APEX  | 41CP 6683 | BSH | 48               | DMQC at 09.03.2020: Starts with relatively rapid drift at cycle 48 and      |
|          |            |       |           |     |                  | then levels off around cycle 120. Corrections at end are as large as -0.039 |

| 6902633  | 27.09.2015 | APEX | 41CP 6687 | BSH | 84  | DMQC at 09.02.2020: shows a slight drift from the beginning with          |
|----------|------------|------|-----------|-----|-----|---|
|          |            |      |           |     |     | corrections between -0.004 to -0.008 which develops into a fast salty     |
|          |            |      |           |     |     | drift after cycle 84 and which reaches -0.035 at the end.                 |
| 6902634† | 26.09.2015 | APEX | 41CP 6688 | BSH | ~58 | DMQC at 10.03.2020: starts a rapid drift at cycle 58 and continues linear |
|          |            |      |           |     |     | until the end with levels of -0.0566. the first cycle has been corrected  |
|          |            |      |           |     |     | with an offset of -0.0049.  |



The floats show three distinct batches of serial numbers which are affected by the fast salty drift. First batch with SN in the range between 5800-6800, second batch with SN in the range 8000-8800 and a developing batch with SN >9400. The floats concerned are either Argo-Germany floats operated by BSH, European Union floats in the MOCCA project and one float each from adopted national programs of the Netherlands and Finland. The figures below are output from the OWC software.

**Group I** with serial numbers in the range 5800-6800 (1901355, 1901360, 1901362, 3901089, 4901428, 4901429, 4901682, 4901683, 6901908, 6901978, 6902016, 6902554, 6902565, 6902567, 6902573, 6902574, 6902575, 6902584, 6902604, *6902612*, 6902621, 6902623, 6902624, 6902626, 6902627, 6902632, 6902633, 6902634)

**Group II** with serial numbers in the range 8000-8800 (*3901590*, 3901608, 3901609, 3901611, 3901841, 3901859, 3901867, 3901869, 3901868, 3901872, 3901873, 3901896, 3901897, 3901898, 3901909, 3901946, 3901952, 3901953, 3901979)

**Group III** with serial numbers >9400 (3901628, 3901636, 3901652, 3901656, 3901657)

# Group I

# Float 1901355 SBE SN 5951:











#### Float 1901360 SBE SN 6428:











# Float 1901362 SBE SN 6430:











#### Float 3901089 SBE SN 6789:











#### Float 4901428 SBE SN 6742:











#### Float 4901429 SBE SN 6785:











# Float 4901682 SBE SN 6787:











#### Float 4901683 SBE SN 6788:











# Float 6901908 SBE SN 6462:











#### Float 6901978 SBE SN 6625:











# Float 6902016 SBE SN 6552:























# Float 6902554 SBE SN 6009 deep:











# Float 6902565 SBE SN 6597:











#### Float 6902567 SBE SN 6608:











### Float 6902573 SBE SN 6617:











#### Float 6902574 SBE SN 6621:











# Float 6902575 SBE SN 6622:











#### Float 6902584 SBE SN 6262:











### Float 6902604 SBE SN 6224:











#### Float 6902612 SBE SN 7073:











# Float 6902621 SBE SN 5951:











#### Float 6902623 SBE SN 6377:











### Float 6902624 SBE SN 6378:











#### Float 6902626 SBE SN 6380:











# Float 6902627 SBE SN 6371:











#### Float 6902632 SBE SN 6683:











# Float 6902633 SBE SN 6687:











#### Float 6902634 SBE SN 6688:











# Group II

# Float 3901590 SBE SN 7873:











#### Float 3901608 SBE SN 8611:











# Float 3901609 SBE SN 8613:











#### Float 3901611 SBE SN 8616:











# Float 3901841 SBE SN 8054:











#### Float 3901859 SBE SN 8097 cycles 1-66:











# Float 3901859 SBE SN 8097 starting cycle 67:











#### Float 3901867 SBE SN 8105:



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34.5







-2500 L

35 36 37 Salinity (PSS-78)

35 36 37 Salinity (PSS-78)

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# Float 3901869 SBE SN8122:











#### Float 3901868 SBE SN 8116:













Float 3901872 SBE SN 8125:









#### Float 3901873 SBE SN 8126:













Float 3901896 SBE SN 8265:









Float 3901898 SBE SN 8267:











# Float 3901897 SBE SN 8266 shallow:









#### Float 3901897 SBE SN 8266 deep:















3901897, cycles:45 compared to 3901820, cycles:30(magenta)

Courtesy of Cecile Cabanes

# Float 3901909 SBE SN 8282:











#### Float 3901946 SBE SN 8515:











#### Float 3901952 SBE SN 8555 reference level in central water:









# Float 3901952 SBE SN 8555 reference level in deep water:











# Float 3901953 SBE SN 8608:











#### Float 3901979 SBE SN 8747:











# Float 3901979 SBE SN 8747 after cycle 108:





- 144 - 149 - 159 - 159 - 164 - 159 - 164 - 179 - 174 - 179 - 184 - 199 - 209 - 214 - 219 - 224 -





# Group III

### Float 3901628 SBE SN 9461:











#### Float 3901636 SBE SN 9518:











# Float 3901652 SBE SN 9999:











#### Float 3901656 SBE SN 10055:











### Float 3901657 SBE SN 10016:









