Comments from Public Consultation on ECV Requirements 13/01 – 13/03 2020 for:

# Air pressure

## ECV Product: Air Pressure (near surface)

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| **Name** | Air Pressure (near surface) | | | | |
| **Definition** | Pressure at a known height above the surface with the height specified in the metadata. | | | | |
| **Unit** | hPa | | | | |
| **Note** | Observations made over the ocean are not static, being mostly recorded by mobile ships and drifting buoys (Kent et al., 2019). Requirements for marine surface observations must therefore be defined in terms of the composite accuracy and sampling of the marine observing networks to achieve comparable uncertainty thresholds at similar resolution.  The primary application of pressure in monitoring relates to the use of reanalysis and so these requirements have been set in this regard.  Timeliness does not preclude delayed mode acquisition via e.g. data rescue.  Reanalysis community to be consulted.  Stability needs to be checked and verified.  Important also, but not covered in the table, is the observation location information. A mis-placed observation of surface pressure (particularly the station elevation) will have substantial implications for reanalysis applications. | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 10 | Primary use is reanalysis so these are the same as  NWP requirements |
| B | 100 |
| T | 500 |
| **Vertical Resolution** | N/A |  | G | N/A | N/A |
| B | N/A | N/A |
| T | N/A | N/A |
| **Temporal Resolution** | hr |  | G | 1 |  |
| B | 3 |  |
| T | 6 |  |
| **Timeliness** | hr |  | G | 1 |  |
| B | 3 |  |
| T | 24 |  |
| **Required Measurement Uncertainty** | hPa |  | G | 0.5 |  |
| B | 1 |  |
| T | 1 |  |
| **Stability** | hPa/decade |  | G | 0.05 |  |
| B | 0.1 | – |
| T | 0.5 |  |
| **Standards and References** | Kent, E.C., Rayner, N.A., Berry, D.I., Eastman, R., Grigorieva, V.G., Huang, B., Kennedy, J.J., Smith, S.R. and Willett, K.M., 2019: Observing Requirements for Long-Term Climate Records at the Ocean Surface. Frontiers in Marine Science 6, Article 441, doi:10.3389/fmars.2019.00441. | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** |  |  | Reviewers are invited to suggest answers for these fields | | |
| **Extremes[3]** |  |  | Reviewers are invited to suggest answers for these fields | | |

[1]Goal (G); Breakthrough (B) (not mandatory, more as one possible); Threshold (T), for definitions see [Guidelines](http://tiny.cc/ecv-review" \t "_blank)

[2] Is the ECV Product directly relevant to support Climate Adaptation?

[3] Can the ECV Product be used to monitor climate extremes or aspects of extremes?

### Comment 1

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| --- | --- |
| Author: **Bruce Ingleby** | Email: **bruce.ingleby@ecmwf.int** |
| Hello. For goal I would suggest 0.3 hPa rather than 0.5 hPa. This is achievable, certainly for measurement uncertainty (representation uncertainty can be significant). For land stations there should be a statement about the height accuracy needed (ideally 1 or 2 m, a 1 m error is equivalent to a pressure error of almost 0.1 hPa; see  Assimilation of station level pressure and errors in station height, N B Ingleby, Weather and Forecasting, 10, pp 172-182, 1995.) Unfortunately avoidable height errors continue to be a problem at some stations. Stations on ice will change height over time and to some extent stations on solid land will too. When (re)surveying stations using GPS or other GNSS system care should be taken that heights are provided relative to the geoid (mean sea level) - GNSS systems work relative to a reference ellipsoid and there are differences of tens of metres between the geoid and the ellipsoid depending on location (the "undulation of the geoid" - provided by various web sites). Unfortunately some surveyors are completely unaware of this reference issue and provide the height direct from GPS using the wrong reference. To get station heights to good accuracy the GNSS measurements should be taken over hours and not minutes (but others know more about this than I do). | |

### Comment 2

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| Author: **ECMWF** | Email: **ecresgcosreqs@gmail.com** |
| NWP and reanalysis requirements at ECMWF are roughly in line with the stated requirements. Surface pressure observations are a very important source of information into our data assimilation system. In reanalyses, like ERA-Interim and ERA5, dry mass varies in the order of 0.1 hPa, which is much more than what is commonly believed. It is the result of a violation of conservation of dry mass in the assimilation system. The standard deviation of the ERA5 surface pressure product with respect to observations is around 0.6 hPa for recent years.  We agree with the comment by Bruce Ingleby that the goal for uncertainty should be better than 0.5 hPa, 0.3 hPa being a reasonable value. | |

### Comment 3

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| Author: Shinya Kobayashi | Email: **shn.kobayashi@gmail.com** |
| \* Timeliness  Given a longer cut-off-time for near-real-time continuation of reanalysis than that for NWP, the timeliness requirements could be relaxed, for example, to 6 hr (Goal), 12 to 24 hr (Breakthrough) and 2 day (Threshold) respectively.  \* Stability  Considering the fact that trends of atmospheric circulation indices based on surface pressure (e.g. Northern Annular Mode, Southern Annular Mode) are the order of 1 hPa/decade (IPCC AR5 WGI Section 10.3.3), the proposed stability requirements seem a little too large. More appropriate requriments would be 0.02 (Goal, the same as that in GCOS IP 2016), 0.1 (Breakthrough) and 0.2 (Threshold) respectively. | |