

## Appendixes

### Appendix 1: R packages used for creating the “quality controlled dataset”

- Applegate P. (2016). mise: Clears the Workspace (Mise en Place). R package version 0.1.0. <https://CRAN.R-project.org/package=mise>
- Bengtsson H. (2021). matrixStats: Functions that Apply to Rows and Columns of Matrices (and to Vectors). R package version 0.58.0. <https://CRAN.R-project.org/package=matrixStats>
- Blagotić, A. and Daróczy, G. (2021). Rapport: a report templating system. R package version 1.1, URL <https://cran.r-project.org/package=rapport>
- Blagotić, A. and Daróczy, G. (2014). Rapport: a report templating system. R package version 1.0, URL <http://cran.r-project.org/package=rapport>
- Carstensen B., Plummer M., Laara E., Hills M. (2021). Epi: A Package for Statistical Analysis in Epidemiology. R package version 2.44. URL <https://CRAN.R-project.org/package=Epi>
- Carstensen B., Plummer M. (2011). Using Lexis Objects for Multi-State Models in R. *Journal of Statistical Software*, 38(6), 1-18. URL <https://www.jstatsoft.org/v38/i06/>.
- Chang W., Cheng J., Allaire J.J, Sievert C., Schloerke B., Xie Y., Allen J., McPherson J., Dipert A. and Borges B. (2021). shiny: Web Application Framework for R. R package version 1.6.0. <https://CRAN.R-project.org/package=shiny>
- Cheng J., Sievert C., Chang W., Xie Y. and Allen J. (2021). htmltools: Tools for HTML. R package version 0.5.1.1. <https://CRAN.R-project.org/package=htmltools>
- Couture-Beil A. (2018). rjson: JSON for R. R package version 0.2.20. <https://CRAN.R-project.org/package=rjson>
- Dowle M., and Srinivasan A. (2021). data.table: Extension of `data.frame`. R package version 1.14.0. <https://CRAN.R-project.org/package=data.table>
- Firke S. (2021). janitor: Simple Tools for Examining and Cleaning Dirty Data. R package version 2.1.0. <https://CRAN.R-project.org/package=janitor>
- Fischer P. (2021). Effects\_measuring\_devices\_sampling\_strategies\_monitoring\_data.Rmd, R notebook, [https://github.com/pfischer-awi/centre\\_for\\_scientific\\_diving/blob/241534ac4f9c170279dff7d0dd59ee19c66efecf/Effects\\_measuring\\_devices\\_sampling\\_strategies\\_monitoring\\_data.Rmd](https://github.com/pfischer-awi/centre_for_scientific_diving/blob/241534ac4f9c170279dff7d0dd59ee19c66efecf/Effects_measuring_devices_sampling_strategies_monitoring_data.Rmd)
- Fox J. and Weisberg S. (2019). An (R Core Team) Companion to Applied Regression, Third Edition. Thousand Oaks CA: Sage. URL: <https://socialsciences.mcmaster.ca/jfox/Books/Companion/>
- Gagolewski M. and others (2020). R package stringi: Character string processing facilities. <http://www.gagolewski.com/software/stringi/>.
- Grolemund G., Wickham H. (2011). Dates and Times Made Easy with lubridate. *Journal of Statistical Software*, 40(3), 1-25. URL <https://www.jstatsoft.org/v40/i03/>.
- Grosjean Ph. (2021). SciViews-R. UMONS, Mons, Belgium. URL <https://www.sciviews.org/SciViews-R/>.
- Grömping U. (2006). Relative Importance for Linear Regression in R: The Package relaimpo. *Journal of Statistical Software*, 17(1), 1--27.
- Harrell Jr F.E, with contributions from Charles Dupont and many others. (2021). Hmisc: Harrell Miscellaneous. R package version 4.5-0. <https://CRAN.R-project.org/package=Hmisc>
- Henry L. and Wickham H. (2020). purrr: Functional Programming Tools. R package version 0.3.4. <https://CRAN.R-project.org/package=purrr>
- Honaker J., King G, Blackwell M. (2011). Amelia II: A Program for Missing Data. *Journal of Statistical Software*, 45(7), 1-47. URL <http://www.jstatsoft.org/v45/i07/>.
- Hope R.M. (2013). Rmisc: Rmisc: Ryan Miscellaneous. R package version 1.5. <https://CRAN.R-project.org/package=Rmisc>

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- James D. and Hornik K. (2020). chron: Chronological Objects which Can Handle Dates and Times. R package version 2.3-56.
- Kvalnes T. (2013). lmf: Functions for estimation and inference of selection in age-structured populations. R package version 1.2. <https://CRAN.R-project.org/package=lmf>
- Lang D.T. (2021). RCurl: General Network (HTTP/FTP/...) Client Interface for R. R package version 1.98-1.3. <https://CRAN.R-project.org/package=RCurl>
- Ooms J. (2019). curl: A Modern and Flexible Web Client for R. R package version 4.3. <https://CRAN.R-project.org/package=curl>
- Ooms J. (2014). The jsonlite Package: A Practical and Consistent Mapping Between JSON Data and R Objects. arXiv:1403.2805 [stat.CO] URL <https://arxiv.org/abs/1403.2805>.
- Plummer M., Carstensen B. (2011). Lexis: An R Class for Epidemiological Studies with Long-Term Follow-Up. Journal of Statistical Software, 38(5), 1-12. URL <https://www.jstatsoft.org/v38/i05/>.
- R Core Team (2021). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.
- Ryan J. and Ulrich J.M. (2020). xts: eXtensible Time Series. R package version 0.12.1. <https://CRAN.R-project.org/package=xts>
- Schruth D. (2013). caroline: A Collection of Database, Data Structure, Visualization, and Utility Functions for R. R package version 0.7.6. <https://CRAN.R-project.org/package=caroline>
- Sibley T. (2019). scriptName: Determine a Script's Filename from Within the Script Itself. R package version 1.0.1. <https://CRAN.R-project.org/package=scriptName>
- Sievert C. Interactive Web-Based Data Visualization with R, plotly, and shiny. Chapman and Hall/CRC Florida, 2020.
- Shih D.J.H. (2018). filenamer: Easy Management of File Names. R package version 0.2.3. <https://CRAN.R-project.org/package=filenamer>
- Vaidyanathan R., Xie Y., Allaire J.J., Cheng J., Sievert C. and Russell K. (2020). htmlwidgets: HTML Widgets for R. R package version 1.5.3. <https://CRAN.R-project.org/package=htmlwidgets>
- Valentim Dias D. (2018). ini: Read and Write '.ini' Files. R package version 0.3.1. <https://CRAN.R-project.org/package=ini>
- Venables, W.N. & Ripley, B.D. (2002) Modern Applied Statistics with S. Fourth Edition. Springer, New York. ISBN 0-387-95457-0
- Wang, E., Cook D., and Hyndman R.J. (2020). A new tidy data structure to support exploration and modeling of temporal data, Journal of Computational and Graphical Statistics, 29:3, 466-478, doi:10.1080/10618600.2019.1695624.
- Warnes G.R., Bolker B. and Lumley T. (2020). gtools: Various R Programming Tools. R package version 3.8.2. <https://CRAN.R-project.org/package=gtools>
- Wickham H. (2021). rvest: Easily Harvest (Scrape) Web Pages. R package version 1.0.0. <https://CRAN.R-project.org/package=rvest>
- Wickham H., François R., Henry L. and Müller K. (2021). dplyr: A Grammar of Data Manipulation. R package version 1.0.5. <https://CRAN.R-project.org/package=dplyr>
- Wickham H., Hester J. and Chang W. (2021). devtools: Tools to Make Developing R Packages Easier. R package version 2.4.0. <https://CRAN.R-project.org/package=devtools>
- Wickham H. (2020). httr: Tools for Working with URLs and HTTP. R package version 1.4.2. <https://CRAN.R-project.org/package=httr>
- Wickham H. and Hester J. (2020). readr: Read Rectangular Text Data. R package version 1.4.0. <https://CRAN.R-project.org/package=readr>
- Wickham H. and Bryan J. (2019). readxl: Read Excel Files. R package version 1.3.1. <https://CRAN.R-project.org/package=readxl>
- Wickham H. (2011). The Split-Apply-Combine Strategy for Data Analysis. Journal of Statistical Software, 40(1), 1-29. URL <http://www.jstatsoft.org/v40/i01/>.

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- Wickham H. (2007). Reshaping data with the reshape package. *Journal of Statistical Software*, 21(12).
- Wickham H. (2007). Reshaping Data with the reshape Package. *Journal of Statistical Software*, 21(12), 1-20. URL <http://www.jstatsoft.org/v21/i12/>.
- Widgren S. and Hulbert C.(2019). rmatio: Read and Write 'Matlab' Files. R package version 0.14.0. <https://CRAN.R-project.org/package=rmatio>
- Xie Y. (2021). knitr: A General-Purpose Package for Dynamic Report Generation in R. R package version 1.32.
- Xie Y. (2015) *Dynamic Documents with R and knitr*. 2nd edition. Chapman and Hall/CRC. ISBN 978-1498716963
- Xie Y. (2014) knitr: A Comprehensive Tool for Reproducible Research in R. In Victoria Stodden, Friedrich Leisch and Roger D. Peng, editors, *Implementing Reproducible Computational Research*. Chapman and Hall/CRC. ISBN 978-1466561595

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Appendix 2: Statistical results of linear regression of temperature change over time in the Svalbard dataset using minimal, mean and maximal temperatures calculated over day, week or month always based on the basic Svalbard dataset.

		temperature increase $y^{-1}$ / statistical significance								
		day			week			month		
	Sampling scheme	min. value	mean value	max. value	min. value	mean value	max. value	min. value	mean value	max. value
Sensor id	13	0.33 ***	0.34 ***	0.34 ***	0.34 **	0.34 ***	0.33 ***	0.22 n.s	0.33 n.s	0.41 *
	14	0.15 ***	0.15 ***	0.15 ***	0.15 n.s.	0.13 n.s.	0.11 n.s.	0.03 n.s	0.10 n.s	0.12 n.s
	15	0.21 ***	0.20 ***	0.19 ***	0.26 **	0.20 *	0.11 n.s.	0.25 n.s	0.21 n.s	-0.06 n.s
	16	0.14 ***	0.14 ***	0.14 ***	0.15 n.s	0.12 n.s	0.09 n.s	0.02 n.s	0.09 n.s	0.11 n.s
	Quality controlled dataset	0.21 ***	0.21 ***	0.22 ***	0.20 **	0.19 **	0.19 **	0.12 n.s	0.17 n.s	0.21 n.s