CODECHECK certificate 2024-018

https://doi.org/10.5281/zenodo.14235113

Item	Value
Title	Power analysis for personal light exposure measurements and interventions
Authors	Johannes Zauner , Ljiljana Udovicic , Manuel Spitschan
Reference	https://www.researchsquare.com/article/rs-3771881/v1
Codechecker	Stephen J. Eglen
Date of check	2024-11-28 11:00:00
Summary	R quarto document that was able to compile, but see certificate for details of issues arising.
Repository	https://github.com/codecheckers/ZaunerEtAl_PLoS_ONE_2024

Table 1: CODECHECK summary

Output	Comment	Size (b)
`Figures/Figure1.png`	manuscript Figure 1	55580
`Figures/Figure2.png`	manuscript Figure 2	238776
`Figures/Figure3.png`	manuscript Figure 3	971230
`Figures/Figure4.png`	manuscript Figure 4	157929
`Figures/FigureS1.png`	manuscript Figure S1	834232
`Figures/FigureS2.png`	manuscript Figure S2	590147
`Figures/FigureS3.png`	manuscript Figure S3	582716
`Figures/FigureS4.png`	manuscript Figure S4	315312

Table 2: Summary of output files generated

Summary

I could reproduce the Quarto document that generated all the figures that were found in the paper. It was however not straightforward for two reasons:

1. Although the R packaging ecosystem is good, with so many dependencies there can be edge cases to resolve manually. In this case, as noted in the comments of the document, I had a problem with "lme4",

so followed the advice in the document. I also had an issue with one of the packages on github.

2. I hit an error within the Rmd that I was unable to fix; luckily, removing that code chunk had no negative effect on the rest of the document compiling.

Otherwise, the document compiled. I am grateful to the authors' clear instructions on reducing the computation time by reducing the number of samples to simulate.

CODECHECKER notes

I found the code and data to be clearly arranged, and this promised to be a very quick codecheck based on my experience of working with other projects from this research group.

As noted in the summary though, I did hit some issues, but fortunately I could resolve them myself.

Preliminaries

To start I moved the original figures and html:

```
cp PowerCalc.html PowerCalc-orig.html
mv Figures Figurees-orig
mkdir Figures
```

Reducing computation time

The authors provided a clear mechanism for reducing the computation time for sampling (related to Figure 4). I therefore changed line 15 of the quarto doc to read:

```
  n_samples: 10
```

Installation steps

I liked the use of pacman, a package I'd not seen before, for the on-demand installation of packages. Perhaps the only oddity was that it didn't tag the versions of the packages that were required.

Installation of lme4

The first error I hit was that lme4 package was causing errors. The authors did note that this might be an issue, and so I simply ran the following, as suggested:

```
oo <- options(repos = "https://cran.r-project.org/")
install.packages("Matrix", type = "source")
install.packages("lme4", type = "source")
options(oo)
library(lme4)
library(lmerTest)
```

Installation of loglightR

I could not get the group's package to install from github:

```
> p_load_gh(char = packages_github)
```

generated the error:

```
Error in utils::download.file(url, path, method = method, quiet = quiet,  :
  download from 'https://api.github.com/repos/tscnlab/LightLogR/tarball/HEAD' failed
Warning messages:
1: In p_install_gh(package, dependencies, ...) :
  The following may have incorrect capitalization specification:

LightLogR
2: In p_load_gh(char = packages_github) :
Failed to install/load:
tscnlab/LightLogR
```

Luckily, I was able to use the version available on CRAN, which worked fine:

```
install.packages("LightLogR")
```

Running the code

Once package dependencies were satisfied, most of the code worked fine until this snippet:

```
> Nonwear_summary %>%
+ gtsummary::tbl_summary(
+ statistic = list(NonWear ~"{min} - {max}"),
+ label = list(NonWear ~ "Non-Wear Time",
+ valid_Day ~ "Valid Days"),
+ by = valid_Day)
Error in `gtsummary::tbl_summary()`:
! Error processing `label` argument.
! Can't select columns that don't exist.  Column `valid_Day` doesn't exist.
  Select among columns "Id", "Season", "Day", and "NonWear"
Run `rlang::last_trace()` to see where the error occurred.

> colnames(Nonwear_summary)
[1] "Id"        "Season"    "Day"       "NonWear"   "valid_Day"
```

I am not expert enough in the tidyverse to see why this error was generated. Further, I needed to use `rmarkdown::render` to render the document, rather than quarto, so that I could do some debugging. I found:

I therefore gave up, changed the chunk to the following, and pressed-on.

```
Nonwear_summary %>%
  gtsummary::tbl_summary(
    statistic = list(NonWear ~"{min} - {max}"),
    label = list(NonWear ~ "Non-Wear Time"),
    ##valid_Day ~ "Valid Days"),
    by = valid_Day)
```

By luck, the document then compiled. I concluded that rendering this problematic table was not required for the rest of the computation.

Visual comparison of my version of the figures with their versions showed that we had reproduced all the manuscript Figures. The only difference I observed was that my Figure 4 showed much more variance than their Figure 4. This is entirely expected given I only ran 10 samples, rather than 1000.

Computation time

I ran this on a MacBook Pro M1 laptop; once all packages were installed, it took maybe 5-10 minutes to compile.

Highlights

1. I liked the clear instructions and mechanisms for reducing the number of samples required.
2. The code vignette generated the "camera ready" figures that appeared in the publication. (Often times in other work there is manual post-processing of Figures before including them in the manuscript.
3. Excellent to see quarto now being used for such projects. (It has spurred me on to plan a rewrite of codecheck infrastructure to move away from Rmd to quarto.)

Recommendations

Here are some comments if the authors are interested in the 'next level' in reproducibility.

1. Trivial point: your readme didn't tell someone who is new to Quarto exactly how to render the document.
2. Consider use of renv (has been done before in the research group) for stating package dependencies.
3. Convert the code repository into an R package; in this way, by running something like:

```
remotes::install_package("tcnslab/...")
```

might help you with installation issues (or it might not). But having a package for a significant body of work like this would make things tidy.

5. Adding the following to the end of a quarto document will document what environment you compiled your work in. See for example the end of this document for what it generates:

```
sessionInfo()
```

Manifest files

Figure1.png

Comment: manuscript Figure 1

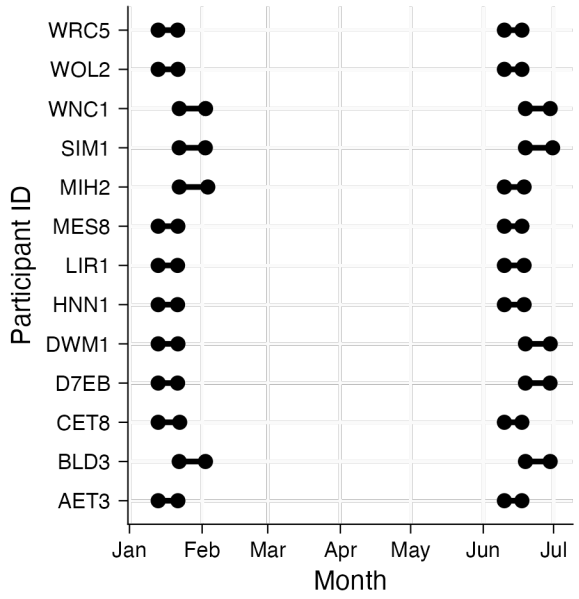


Figure2.png

Comment: manuscript Figure 2

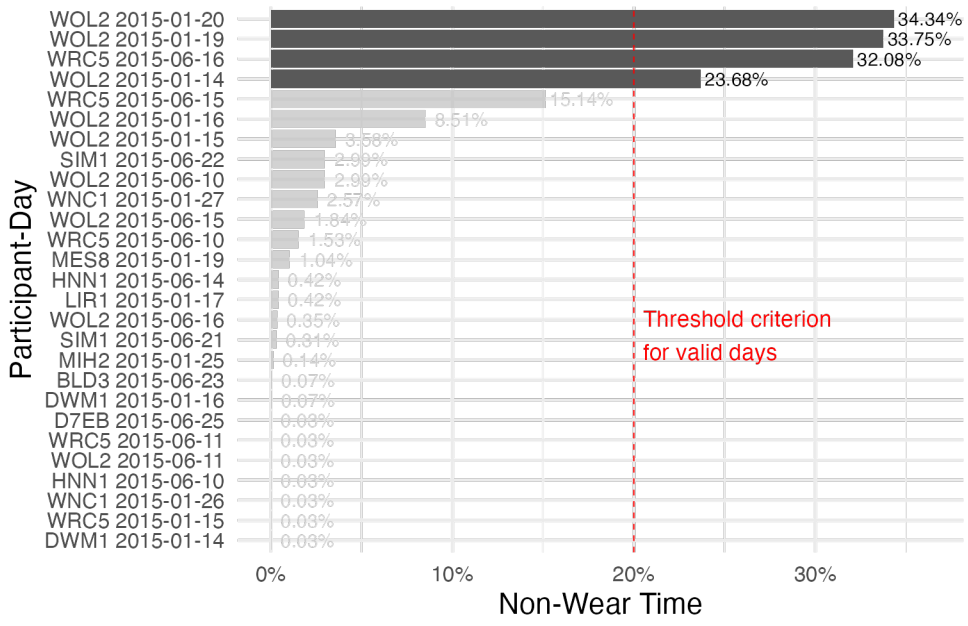
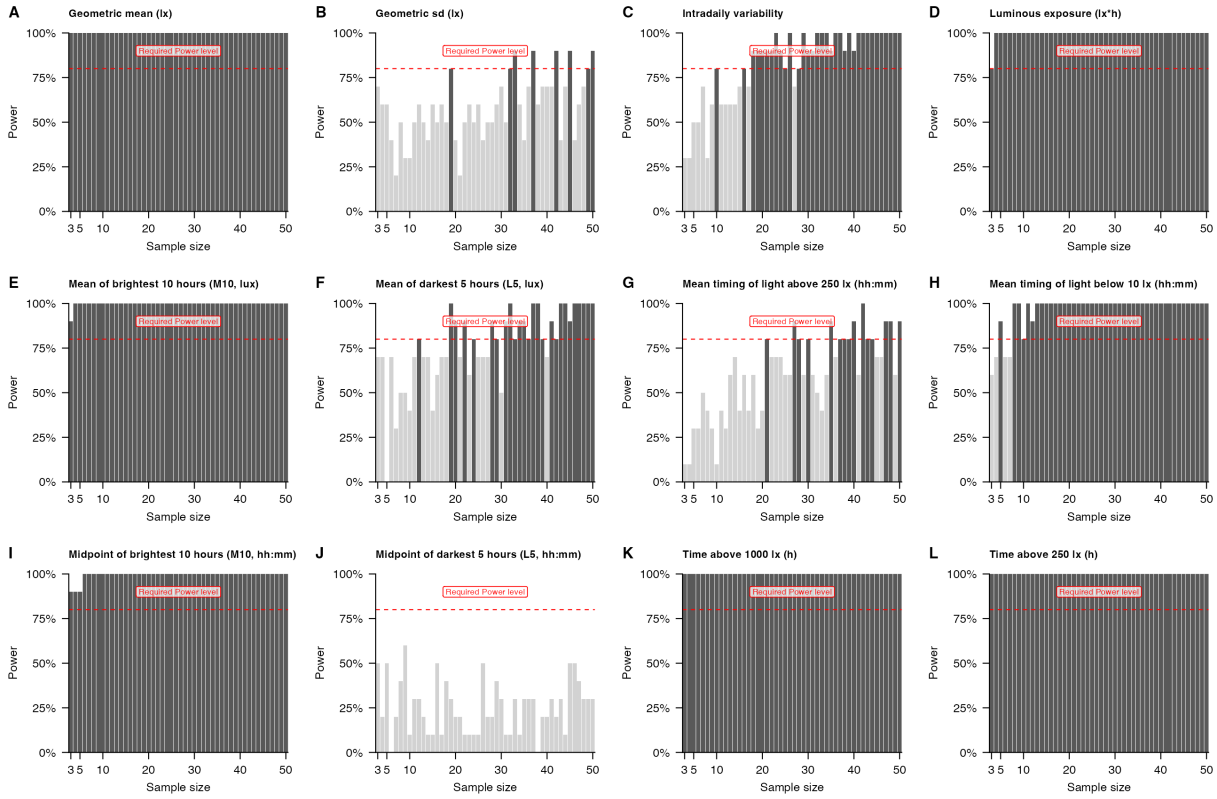


Figure3.png

Comment: manuscript Figure 3

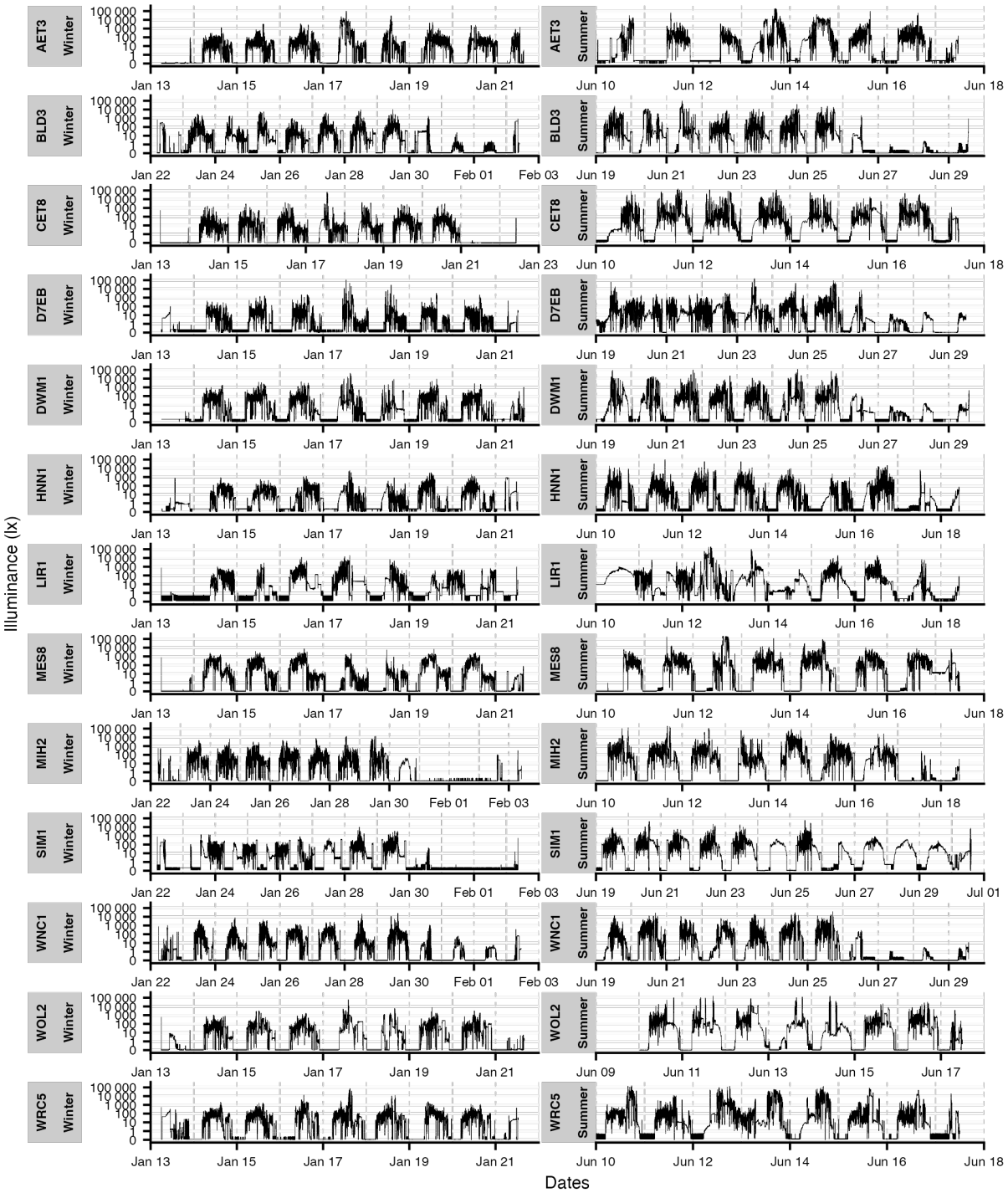
Figure4.png

Comment: manuscript Figure 4



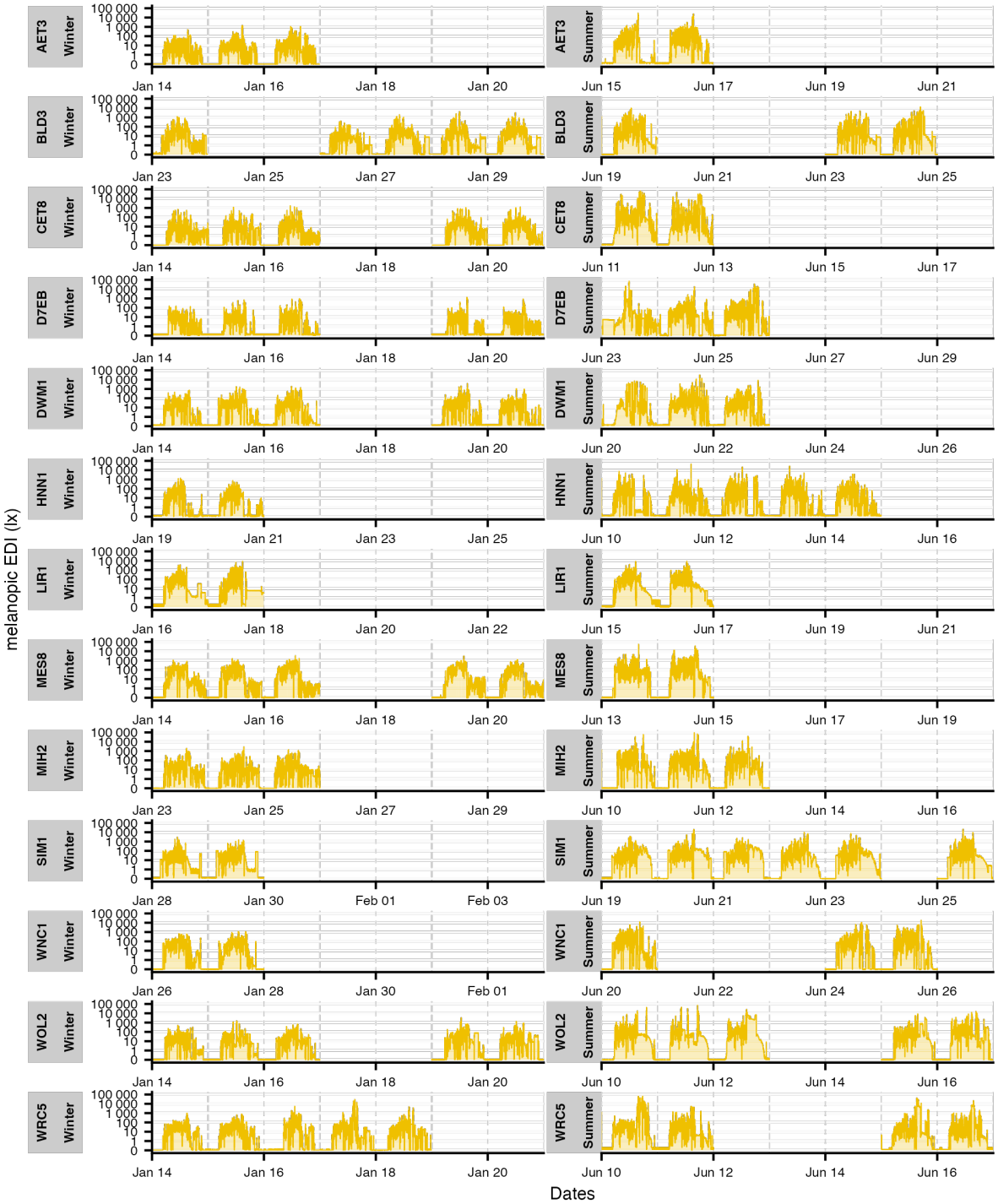
FigureS1.png

Comment: manuscript Figure S1



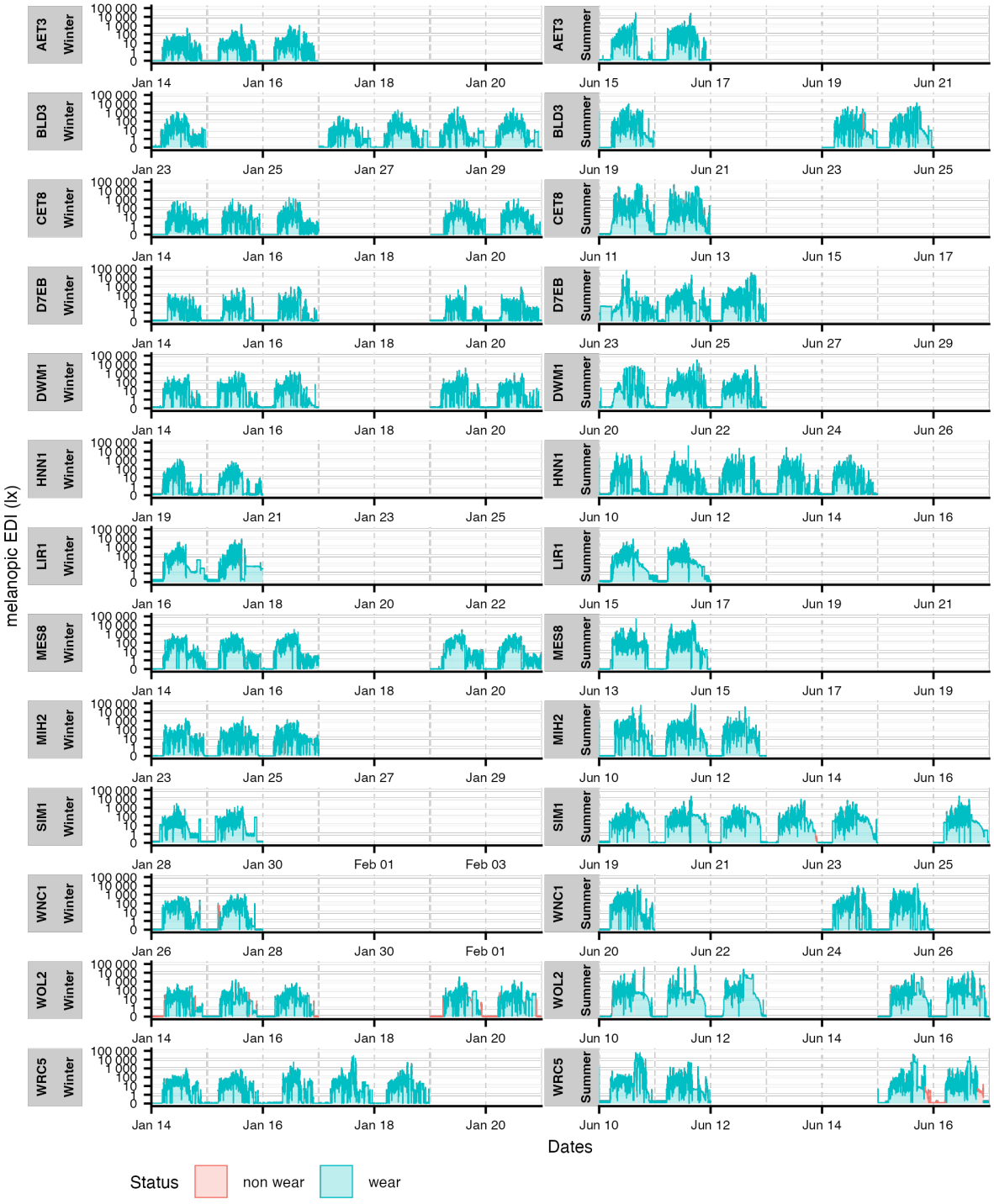
FigureS2.png

Comment: manuscript Figure S2



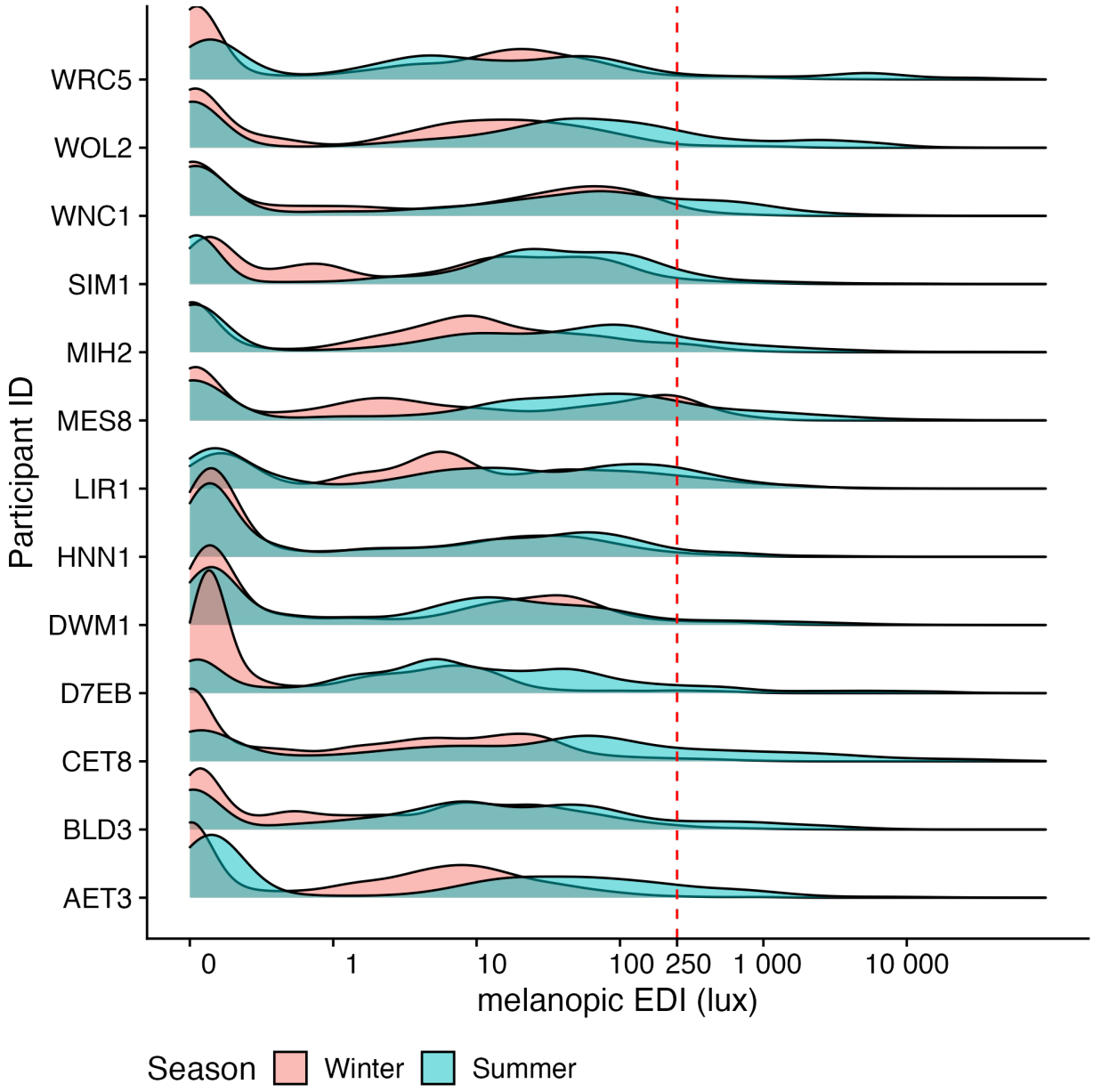
FigureS3.png

Comment: manuscript Figure S3



FigureS4.png

Comment: manuscript Figure S4



Acknowledgements

I would like to thank Dr Bhatt and his team for promptly answering any queries I had with this reproduction. CODECHECK is financially supported by the Mozilla foundation.

Citing this document

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About CODECHECK

This certificate confirms that the codechecker could independently reproduce the results of a computational analysis given the data and code from a third party. A CODECHECK does not check whether the original computation analysis is correct. However, as all materials required for the reproduction are freely available by following the links in this document, the reader can then study for themselves the code and data.

About this document

This document was created using R Markdown using the `codecheck` R package. `make codecheck.pdf` will regenerate the report file.

```
sessionInfo()
```

```
## R version 4.4.2 (2024-10-31)
## Platform: aarch64-apple-darwin24.1.0
## Running under: macOS Sequoia 15.1.1
##
## Matrix products: default
## BLAS:   /opt/homebrew/Cellar/openblas/0.3.28/lib/libopenblasp-r0.3.28.dylib
## LAPACK: /opt/homebrew/Cellar/r/4.4.2_2/lib/R/lib/libRlapack.dylib;  LAPACK version 3.12.0
##
## locale:
## [1] en_GB.UTF-8/en_GB.UTF-8/en_GB.UTF-8/C/en_GB.UTF-8/en_GB.UTF-8
##
## time zone: Europe/Amsterdam
## tzcode source: internal
##
## attached base packages:
## [1] stats     graphics  grDevices utils     datasets
## [6] methods   base
##
## other attached packages:
##  [1] readr_2.1.5      tibble_3.2.1     xtable_1.8-4
##  [4] yaml_2.3.10      rprojroot_2.0.4  knitr_1.48
##  [7] codecheck_0.10.1 parsedate_1.3.1  R.cache_0.16.0
## [10] gh_1.4.1
##
## loaded via a namespace (and not attached):
##  [1] xfun_0.49         rdflib_0.2.9      tzdb_0.4.0
##  [4] vctrs_0.6.5       tools_4.4.2       generics_0.1.3
##  [7] curl_5.2.3        parallel_4.4.2    fansi_1.0.6
## [10] pkgconfig_2.0.3   R.oo_1.27.0       redland_1.0.17-18
## [13] assertthat_0.2.1  lifecycle_1.0.4   compiler_4.4.2
```

```
## [16] atom4R_0.3-3      stringr_1.5.1     keyring_1.3.2
## [19] htmltools_0.5.8.1 pillar_1.9.0      crayon_1.5.3
## [22] whisker_0.4.1     tidyr_1.3.1       R.utils_2.12.3
## [25] cachem_1.1.0      zen4R_0.10        tidyselect_1.2.1
## [28] zip_2.3.1         digest_0.6.37     stringi_1.8.4
## [31] dplyr_1.1.4       purrr_1.0.2       fastmap_1.2.0
## [34] cli_3.6.3         magrittr_2.0.3    XML_3.99-0.17
## [37] crul_1.5.0        utf8_1.2.4        osfr_0.2.9
## [40] withr_3.0.2       bit64_4.5.2       roxygen2_7.3.2
## [43] rmarkdown_2.29    httr_1.4.7        bit_4.5.0
## [46] R.methodsS3_1.8.2 hms_1.1.3         memoise_2.0.1
## [49] evaluate_1.0.1    rlang_1.1.4       Rcpp_1.0.13-1
## [52] glue_1.8.0        httpcode_0.3.0    xml2_1.3.6
## [55] fauxpas_0.5.2     rorcid_0.7.0      vroom_1.6.5
## [58] jsonlite_1.8.9    R6_2.5.1          plyr_1.8.9
## [61] fs_1.6.5
```

```
quarto --version
```

```
## 1.5.57
```