



Evaluation of satellite, gauge and reanalysis precipitation products over Aotearoa New Zealand

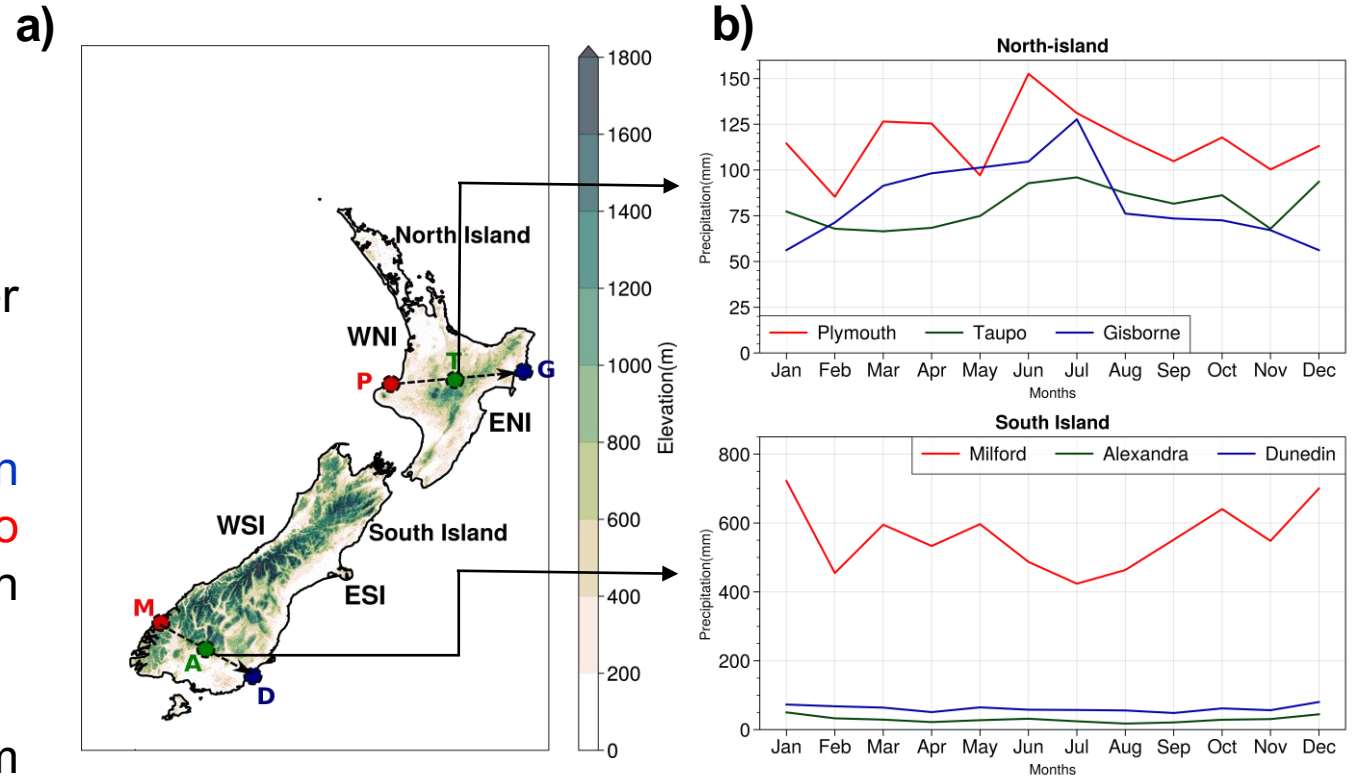
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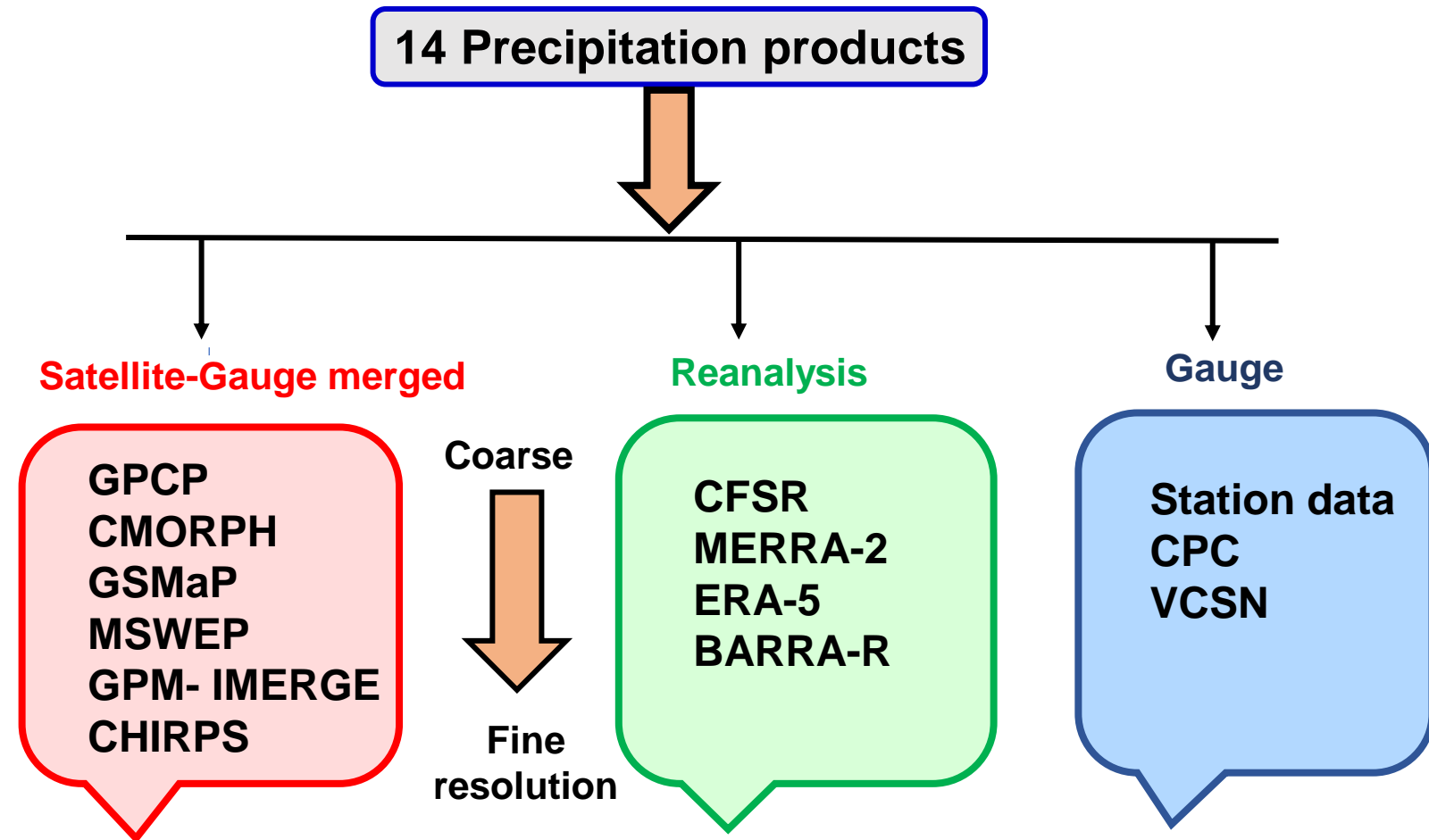
Motivation

- ❑ Precipitation in New Zealand
 - Spatially complex
 - large topographical changes
- ❑ For instance, west-east gradient on either sides of the Southern Alps.
- ❑ High observational station density in many regions, *but not all* - insufficient to capture many fine scale precipitation characteristics.
- ❑ Thus, need to look into the wide spectrum of available products that are closer to the truth.



a) Regional topography over New Zealand with the location of chosen station points used for transect analysis, b) Mean monthly precipitation across the two transects from 1981 - 2010. The red, green and blue lines denote the western, central and eastern station point in the respective transects (T1 (North Island) and T2 (South Island)) as shown in a

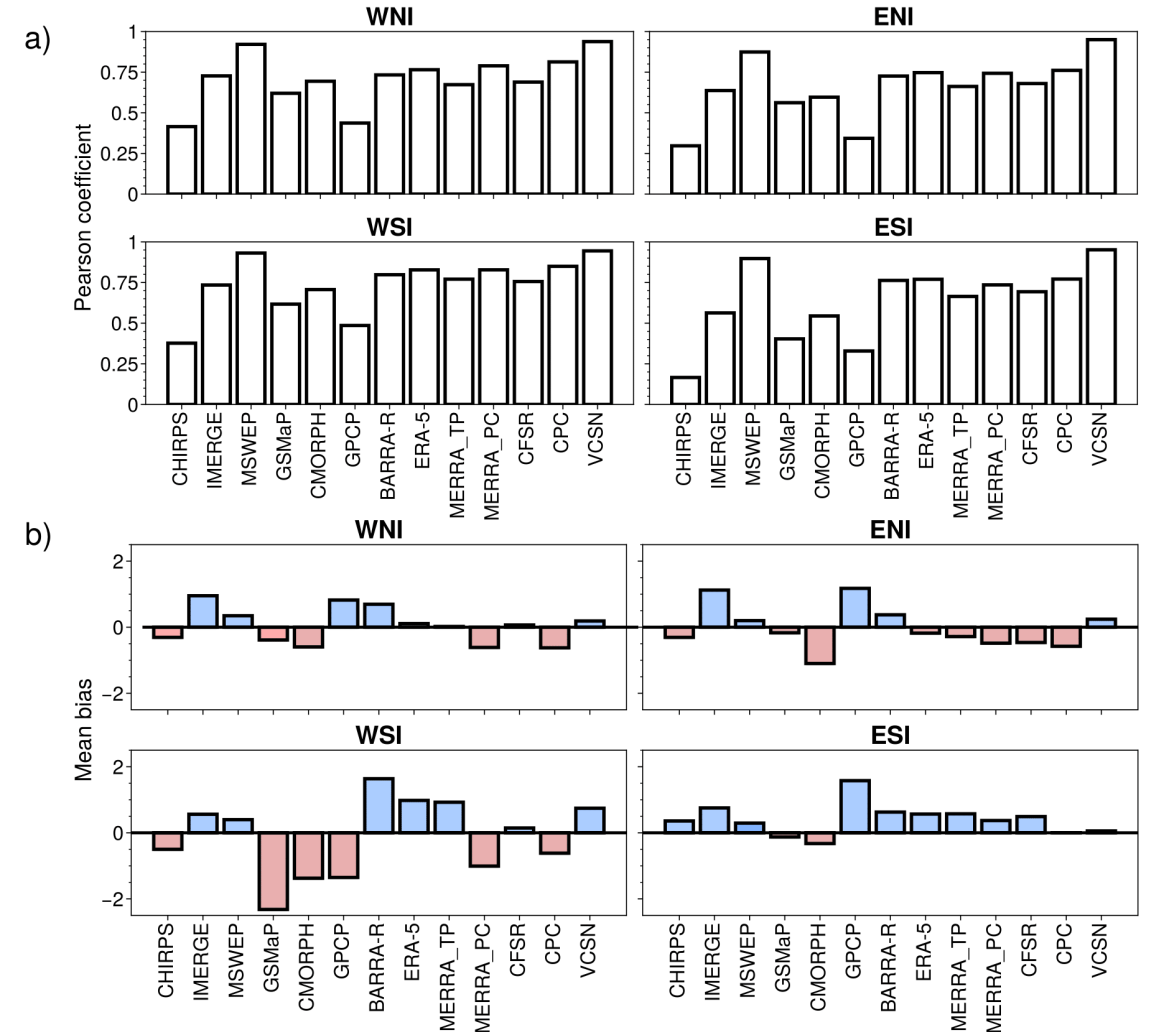
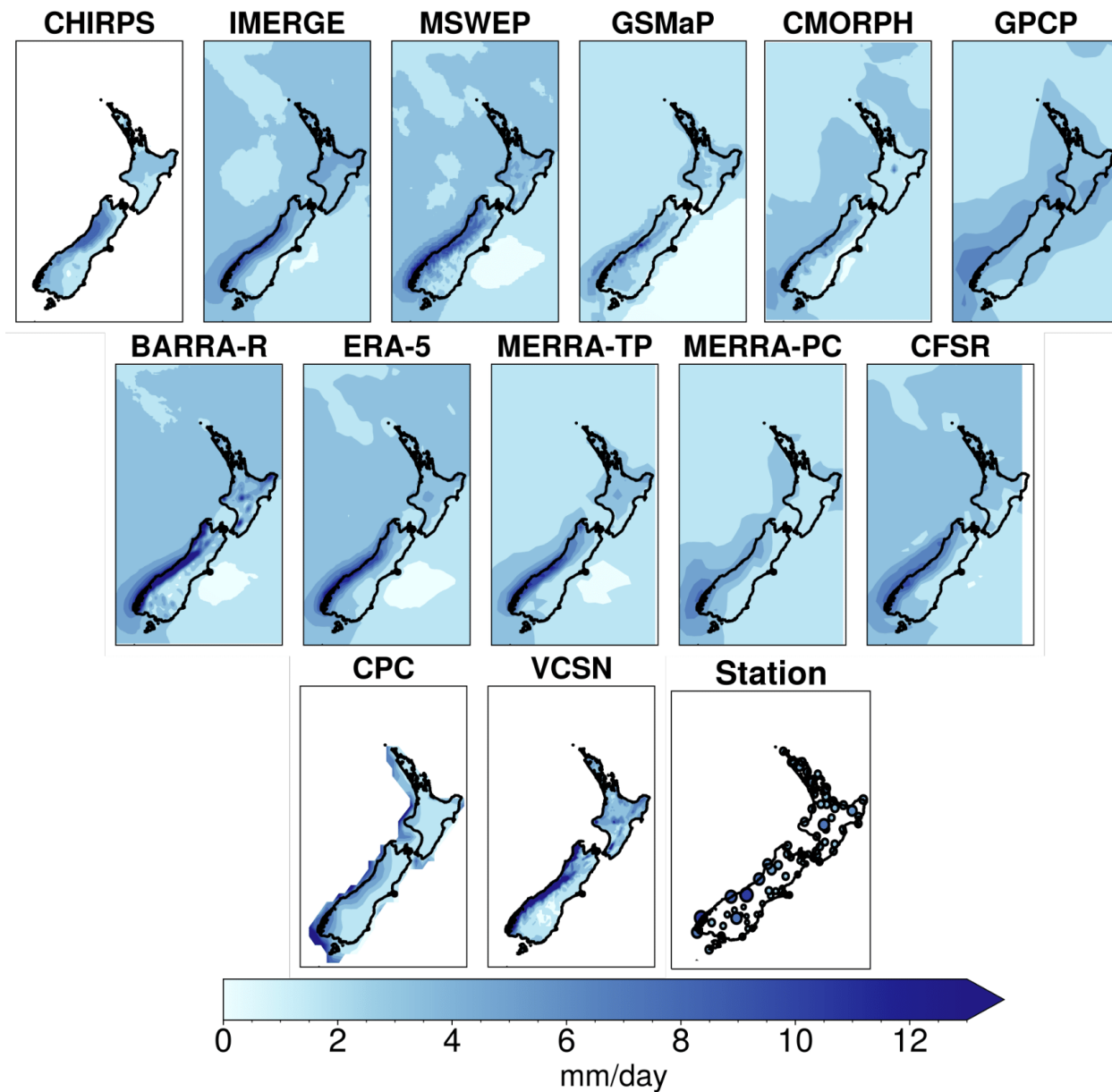
Datasets



- Station data is used as a “*ground truth*” in this study.

- 2001- 2010




Mean precipitation and Evaluation metrics

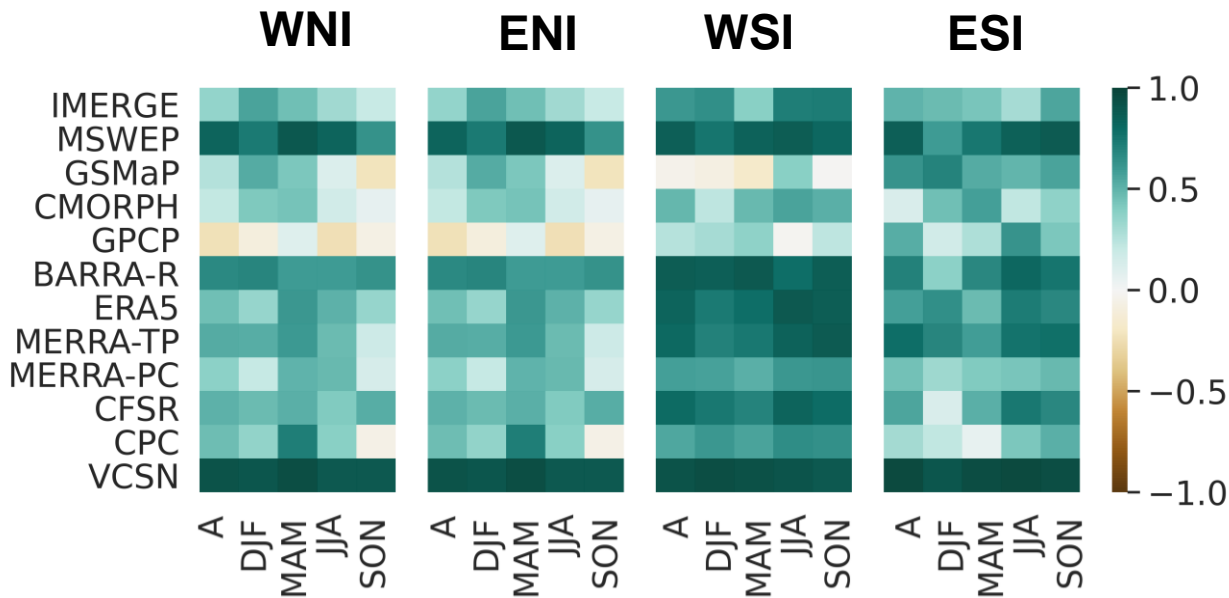


a) Pearson correlation coefficient and **b)** mean bias calculated over the geographical regions for all the precipitation products

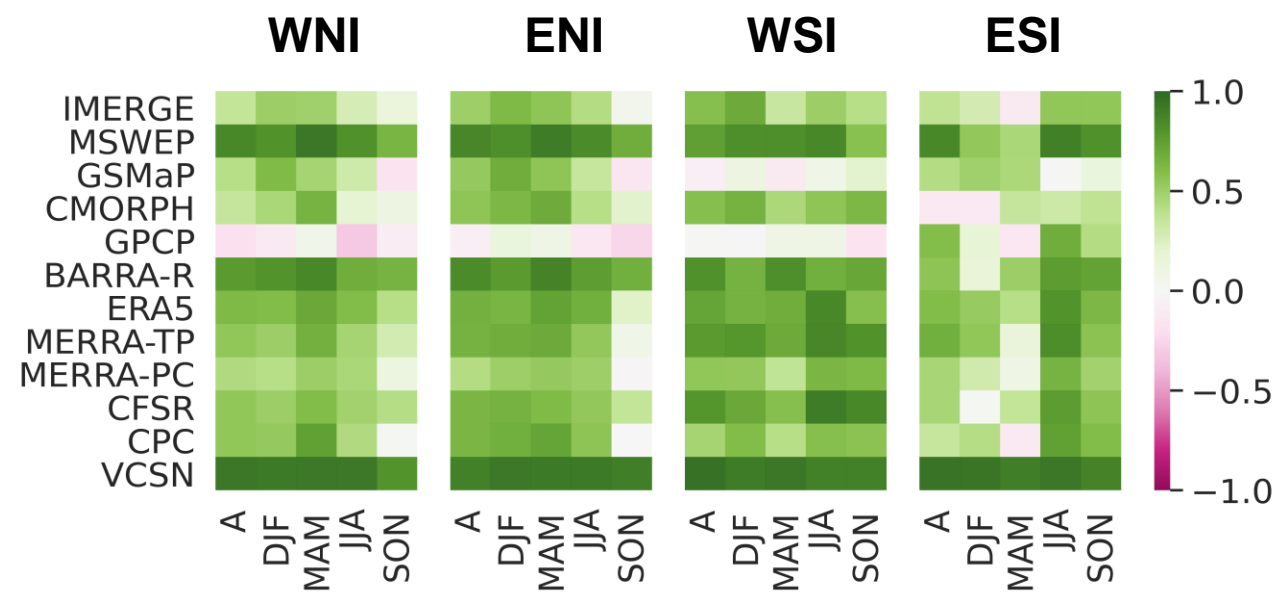
Extreme climate indices : Use of Non parametric KGE metric

$$KGE = 1 - \sqrt{[SR - 1]^2 + [CV - 1]^2 + [MB - 1]^2}$$

 Spearman rank order correlation
 Coefficient of variation
 Ratio of mean bias

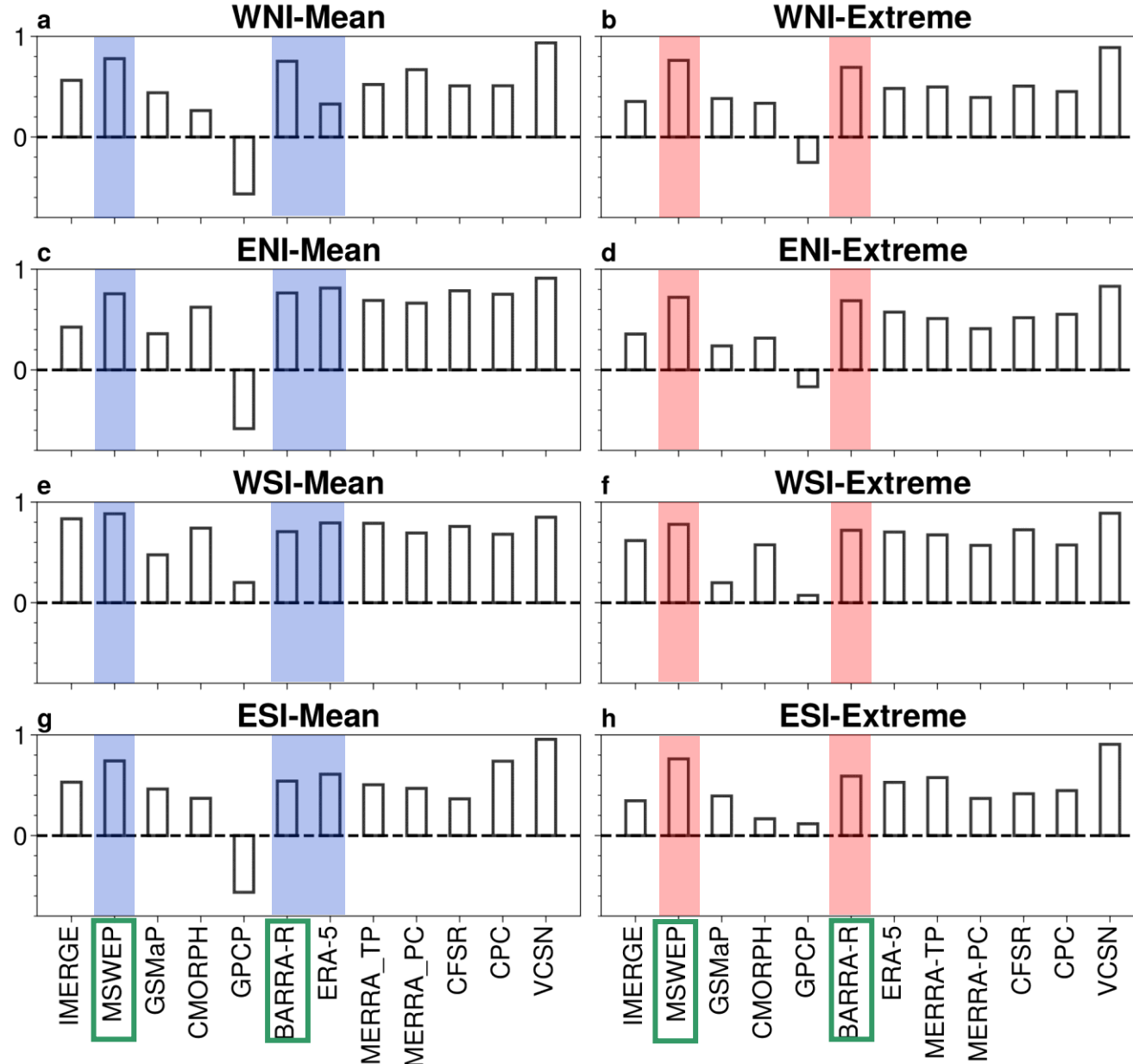


Simple Daily intensity index (SDII)



Annual total precipitation from days > 99th percentile (R99P)

Summary and Conclusion :Overall rank of KGE metric



- For Mean precipitation features : **MSWEP, ERA-5 and BARRA-R**
- For extreme precipitation : **BARRA-R and MSWEP**
- Overall, **MSWEP and BARRA-R** have higher KGE scores for **both mean and extremes over New Zealand**
- GPCP shows the worst performance for both mean and extreme precipitation features