

Subject: Re: ET
From: Victor Van der Meersch <victor.vandermeersch@cefe.cnrs.fr>
Date: 4/4/23, 6:01 PM
To: e wolkovich <e.wolkovich@ubc.ca>

[CAUTION: Non-UBC Email]

Hi Lizzie,

This is already more or less what I do, to compute the vapour pressure deficit (*vas-vabar*, required to calculate PET):

```
# Saturated vapour pressure (August-Roche-Magnus approximation)
vs_Tmax <- 0.6108 * exp(17.27 * data$Tmax / (data$Tmax + 237.3))
vs_Tmin <- 0.6108 * exp(17.27 * data$Tmin / (data$Tmin + 237.3))
vas <- (vs_Tmax + vs_Tmin) / 2

# Vapour pressure
vabar <- (vs_Tmin * data$RHmax / 100 + vs_Tmax * data$RHmin / 100) / 2
```

The issue I see here is that I derive daily RHmin and RHmax from hourly RH values.

I compute these hourly RH with both hourly dewpoint temperature and temperature. The last one should thus changed depending on the variability we will apply.

I think the solution would be to approximate the vapour pressure with daily RHmean (see equation 19: <https://www.fao.org/3/x0490e/x0490e07.htm#estimating%20missing%20humidity%20data>). It should not be a problem in a non-arid area.

In such a case, we would be able to compute RHmean with daily mean dewpoint temperature and daily mean temperature (with our increased variability).

I hope I am clear enough !

We can discuss it tomorrow.

See you,

Victor

De: "Elizabeth M Wolkovich" <wolkovic@mail.ubc.ca>
À: "Victor Van der Meersch" <victor.vandermeersch@cefe.cnrs.fr>
Envoyé: Mardi 4 Avril 2023 17:30:56
Objet: ET

Hi Victor,

I chatted with Ben Cook just now about our ET issue. He suggested we use the August Roche Magnus equation combined with RH (https://en.wikipedia.org/wiki/Clausius%E2%80%93Clapeyron_relation#August%E2%80%93Roche%E2%80%93Magnus_formula). For this approach we would need min and max RH. What do you think of this approach? (I also realized I am not sure if ET is what PhenoFit needs as the files say PET.)

I also asked him your question: "I would expect that min/max temperatures would not be subject to the same variability as mean temperature.

Do minimum and maximum temperatures fluctuate more widely?"

He thought for a while and then said it was a good question and he did not know the answer. For now I think we can work on the analyses as we plan and see where we get.

I'll be in tomorrow if you want to discuss. I will also be in Friday and the following Friday (I am in Zurich next week at the start, I am leaving CEFÉ mostly starting 17 April to meet with Iñaki in Avignon -- my stay feels far too short, I will be sad to go).

All the best,

Lizzie

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