Subject: Re: Comments to dry dep paper
From: Amund Søvde Haslerud <meteorologen@gmail.com>
Date: 05.04.2019, 8:49 p.m.
To: Stefanie Falk <stefanie.falk@geo.uio.no>

Hei Stefanie,
So, to the Ra. It seems I have gotten the equation wrong; Simpson has the same equation as stated by the reviewer. I always used L on the second term, though. But the minus was included wrongly.Maybe we can reply:
The reviewer is indeed correct that the equation is wrong. In fact, we originally used the equation with L in denominator for the second term, but the sign error was likely the reason why the Monteith method was chosen. Certainly, an update should be considered in the future, but it has not been possible to redo all the simulations now. We change the text from "In Simpson et al. (2003,2012) it is described as ... fall back to the" to "For technical reasons we have used the"

Now to point 1:
Rc: So, Rc is not just in-canopy, but also contains a non-stomata contribution. This should perhaps be specified at the start. But I'm not sure I understand the question: We write that the drydep velocity changes from 0.07 in Wesley to 0.05 in EMEP. You can specify that the water resistance of 2000 s/m?

Point 4:
It's simple to add, but be careful that you check/specify if it is tropospheric or trop+strat O3. Not sure if the (trop+strat) O3 makes sense to include.

Point 14:
Since we do not put out the fluxes, I guess this is not straight-forward. Probably Rb is more important than Rc for deserts, at least Rb seems to get smaller setting in guess-values of:
rbL = 2._r8 / (VK * USR) * (Sc_H20 * D_gas(KK) / PrL)**(2._r8/3._r8)
where VK=0.4, USR is not that large, Sx_H2O is 0.6, D_gas for O3 is 1.6 and prL is around 0.7.
Maybe try the same exercise with Rb for ocean?
log(z0w * VK * USR / D_i) / (USR * VK)

where for O3: D_i = D_H2O/1.6, where D_H2O=0.21e-4.

Sorry I can't help more... It's been a while since I worked on this. :-)

It is busy at work, and too busy for perhaps a bit too long periods. But it is better now.

Have a nice weekend and best luck with the responses!

Cheers,
Amund

On Fri, Apr 5, 2019 at 11:19 AM Stefanie Falk <stefanie.falk@geo.uio.no> wrote:

> Hei Amund,
>
> tusen takk!
>
> If you have time, I would also appreciate to hear your thoughts (not the full response to the review ;-)) on point 1, 4, 14 raised by the referee.
>
> Kind regards
>
> Stefanie
>
> On 03.04.2019 10:59 p.m., Amund Søvde Haslerud wrote:
>
> > Hei!
> > I will try to check on Friday!
> > Cheers
> > Amund
> >
> > ons. 3. apr. 2019 kl. 10:09 skrev Stefanie Falk <stefanie.falk@geo.uio.no>:
> >
> > > Hei Amund,
> > >
> > > I hope you are busy but not too busy. We have received the first referee comments on our paper.

I can handle probably all except for one:

"5. Section 2.1.1, Eq. (2): The statement “For certain values of z, z0, and L, this may result in nonphysical (negative) values for Ra.” I do not comprehend as to why this would occur since this equation is simply based on the well-used Monin-Obukhov similarity theory (MOST) for the surface layer. This occurrence would also imply negative wind speeds. Actually Eq. (2) is incorrect: the term psi_m((z-d)/z0) should be psi_m((z-d)/L), and the sign of the third term on the right-hand side should be positive (not negative). Given that (z-d) > z0 (assuming the model is formulated correctly), Eq. (2) should always yield positive values."

It is about the part you have implemented. To be honest I never checked the formulae nor have I traced them trough the the code. Could you check that part? (Until end of next week?)

Thanks a lot.

I have attached the paper pre-print and the referee comments.

Kind regards
Stefanie
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