The reviewer #2 has attached a PDF where we both agree on the starting formula for the total wind stress:

$$\overrightarrow{WS_C} = C_d\, \rho \left|\overrightarrow{W_c}\right| \overrightarrow{W_c} \quad , \qquad \text{(Eq. 1)}$$

However, quick after that, the development of the terms (performed by the reviewer #2) goes wrong in his/her PDF. We find the reason why he/she develops wrongly the equations when reading his/her initial comment (his/her first reply in the Public Forum), where it reads:

'*The zonal and meridional wind stress should be calculated respectively for both wind speed and wind vector. However,* <u>*the authors applied the wind speed as the total wind speed*</u>*. This is definitely resulting in significant over estimation of wind stress.*'

Following this underlined text, the reviewer #2 claims that the mathematical development of Eq. 1 follows:

$$\overrightarrow{WS_C} = C_d\, \rho \left|\overrightarrow{W_c}\right| \overrightarrow{W_c} = \overrightarrow{WS_A} + \overrightarrow{WS_B} = C_d\, \rho \left|\overrightarrow{W_A}\right| \overrightarrow{W_A} + C_d\, \rho \left|\overrightarrow{W_B}\right| \overrightarrow{W_B} \qquad \text{(Eq. 2)}$$

where the last two terms correspond to the zonal and meridional components of the wind stress (i.e. using the zonal and meridional wind speed, respectively, instead of the total wind speed).

We have extracted the zonal and meridional wind stress formulas in Eq.2 from the PDF the reviewer #2 attached in his/her most recent response in the Public Forum. <u>The reviewer #2 has treated the magnitude of the total wind stress in Eq.2 as if it were a vector and has proceeded to decomposed it straightforward into zonal and meridional components</u>. This is not correct. If one proceeds this manner, one will obtain zonal and meridional components of the wind stress that will not lead back to the same total wind stress of departure (proof that something has gone wrong).

Differently, if one uses the following equations (Eqs. 3-5):

$$\overrightarrow{WS_C} = C_d\, \rho \left|\overrightarrow{W_c}\right| \overrightarrow{W_c} = C_d\, \rho \left|\overrightarrow{W_c}\right| \left[\overrightarrow{W_A} + \overrightarrow{W_B}\right] \qquad \text{(Eq. 3)}$$

$$\overrightarrow{WS_C} = C_d\, \rho \left|\overrightarrow{W_c}\right| \overrightarrow{W_A} + C_d\, \rho \left|\overrightarrow{W_c}\right| \overrightarrow{W_B} \qquad \text{(Eq. 4)}$$

$$\overrightarrow{WS_C} = \overrightarrow{WS_A} + \overrightarrow{WS_B} \qquad \text{(Eq. 5)}$$

one obtains zonal and meridional components of the wind stress (Eq. 4-5) that will lead back to the same total wind stress of departure in Eq. 3 (proof that the mathematical development has been performed correctly). The step that differs from the reviewer #2 is the one involving Eq. 4, where $\left|\overrightarrow{W_c}\right|$ must be retained in the zonal and meridional components for the equation to be correct.

In our revised manuscript, we present the resulting Eq. 4 using the terminology commonly used in the literature, which reads (they are equivalent to Eq. 4):

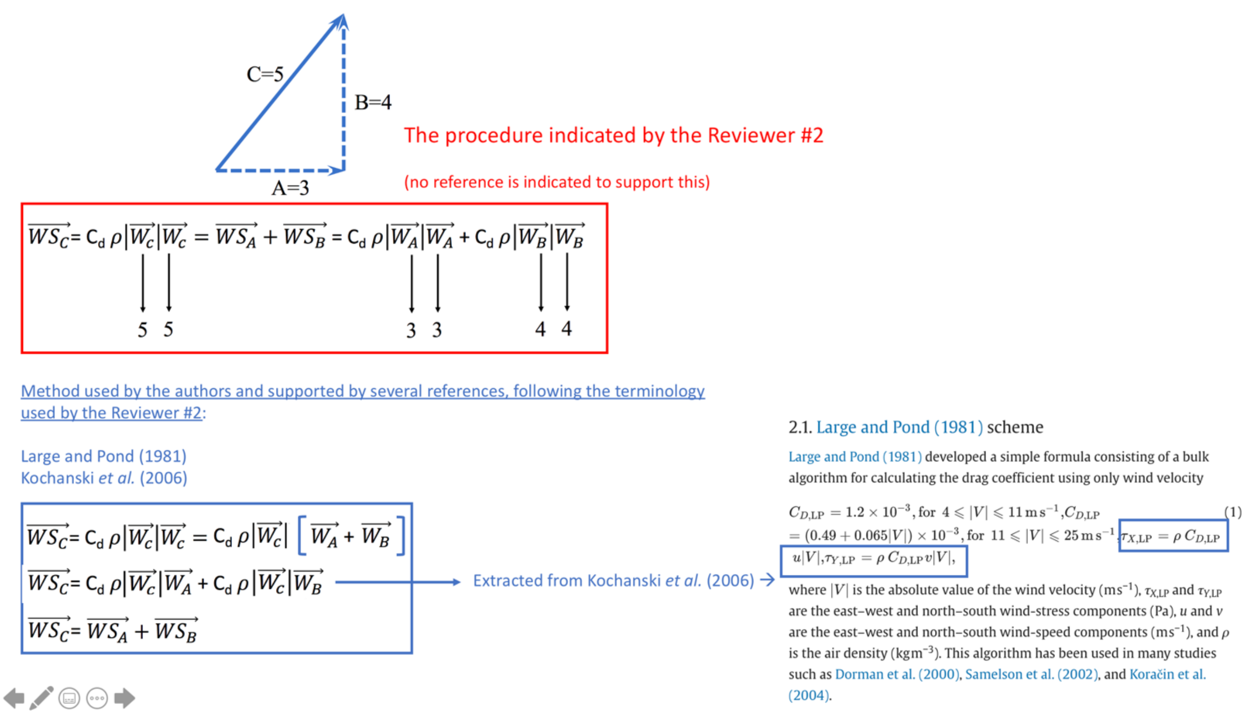
$$\tau_x = \rho \cdot U_{10} \cdot u \cdot C_D \, , \qquad \text{(Eq. 6)}$$

$$\tau_y = \rho \cdot U_{10} \cdot v \cdot C_D \, , \qquad \text{(Eq. 7)}$$

(as already provided in our former response to the reviewer #2).

Lastly, we would like to support further our response by noting the references from the literature that use the same equations that we use: Large and Pond (1981), Kochanski *et al.* (2006) [in this later work the equations we use are explicitly posed as part of their Eq. 1]. Differently, the reviewer #2 has not provided yet references from the literature supporting the equations he/she used.

For clarity, we provide in the following a summary of the mathematical developments discussed above:

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