**Supplement of the response to the comment of the Editor Antonella Longo**

Below is reported the new version of line 23, page 177:

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… volume averaged variable for each phase.

$$\begin{cases} \dfrac{\partial \rho_g}{\partial t} + \vec{\nabla} \bullet \left( \rho_g \vec{v}_g \right) = 0 \\ \dfrac{\partial \rho_s}{\partial t} + \vec{\nabla} \bullet \left( \rho_s \vec{v}_s \right) = 0 \end{cases} \tag{1a}$$

$$\begin{cases} \dfrac{\partial \left( \rho_g \vec{v}_g \right)}{\partial t} + \vec{\nabla} \bullet \left( \rho_g \vec{v}_g \vec{v}_g \right) = K\left( \vec{\nabla} \bullet \vec{v} \right) + \rho_g \vec{g} - \vec{\nabla} p - \vec{\nabla} \bullet \tilde{\tau}_g \\ \dfrac{\partial \left( \rho_s \vec{v}_s \right)}{\partial t} + \vec{\nabla} \bullet \left( \rho_s \vec{v}_s \vec{v}_s \right) = K\left( \vec{\nabla} \bullet \vec{v} \right) + \rho_s \vec{g} - \vec{\nabla} p - \vec{\nabla} \bullet \tilde{\tau}_s \end{cases} \tag{1b}$$

$$\begin{cases} \rho_g C_g \left[ \dfrac{\partial T_g}{\partial t} + \vec{v}_g \bullet \vec{\nabla} T_g \right] = \dot{Q} \Delta T + \dot{K}\left( \Delta \vec{v} \right) - \vec{\nabla} \bullet \vec{q}_g - p_g \left[ \dfrac{\partial \theta_g}{\partial t} + \vec{\nabla} \bullet \theta_g \vec{v}_g \right] \\ \rho_s C_s \left[ \dfrac{\partial T_g}{\partial t} + \vec{v}_s \bullet \vec{\nabla} T_s \right] = Q \Delta T - \vec{\nabla} \bullet \vec{q}_s \end{cases} \tag{1c}$$

The equations 1a, 1b, and 1c state that: the density …

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