Comment of reviewer #2 concerning author's reply dated 2015/12/2

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Once more a comment concerning equations (4) – (6):

The authors claim that they use the equations according to McIlveen correctly.

But this is not the case.

McIlveen defines q as the specific mass (mass of water per total mass) and r as mass of water per mass of dry air.

Using this definitions **equation (4) has to be formulated with q** (according to McIlveen as well as according to my comments before).

Equation (5) corrected by the authors after my first comment ($q = 0.622\ pw\ /p$) is only valid for low moisture content (see McIlveen).

Using the notations r and q of McIlveen equation (6) is indeed correct.

Nevertheless, the exact equations for the mutual conversion of r (=X) and q (=w) given in my last comment (see below) are in my opinion more suitable to describe atmospheric processes with moist air.

R_{air}, R_w = gas constants of air and water

w = mass fraction of **water** (mass of water per mass of mixture)

X = mass of water per mass of **dry** air.

p_w, p_{air} = partial pressures of water and air, respectively.

$p = p_{air} + p_w$ (total pressure)

Quotient of molar masses (water to air) 18 / 29 = 0.622.

Taking into account the definitions above the following correct equations (4) – (6) can be formulated:

$$R = w\ R_w + (1-w)\ R_{air} \qquad (4)$$

$$X = 0.622\ p_w / (p - p_w) \qquad (5)$$

$$w = X / (1 + X) \qquad (6)$$