1. The unit of N_w is $m^{-3}mm^{-1}$ and $mm^{-1}m^{-3}$, both are OK.

Reason: According to $N_w = \frac{4^4}{\pi \rho_w} \frac{LWC}{D_m^4}$, the unit of LWC, ρ_w and D_m are $g \cdot m^{-3}$, $g \cdot cm^{-3}$ and mm^4, the unit of N_w can be deduced as $\frac{1}{g \cdot cm^{-3}} \frac{g \cdot m^{-3}}{mm^4} = \frac{1}{cm^{-3}} \frac{m^{-3}}{mm^4} = \frac{1}{10^{-3}\, mm^{-3}} \frac{m^{-3}}{mm^4} = \frac{1}{10^{-3}} \frac{m^{-3}}{mm^1}$=1000 $m^{-3}mm^{-1}$=1000 $mm^{-1}m^{-3}$.

But $mm^{-1}m^{-3}$ is more commonly used for this parameter.

2. The uint of log(N_w) is not $m^{-3}mm^{-1}$ and $mm^{-1}m^{-3}$. please remove it.

Reason: log(N_w) is an alternative representation of the number (N_w), its base number is 10; we usually do not use $mm^{-1}m^{-3}$ or $m^{-3}mm^{-1}$ as its unit and it is unitless. The increase of log(N_w) does equal the same quantity increase of N_w; the unit of the latter is $mm^{-1}m^{-3}$. It is easy to understand: when log(N_w=10000)=4 increases from log(N_w=1000)=3, log(N_w) apparently increases just by 1 (it does not mean an increase of 1 $mm^{-1}m^{-3}$), but in fact, it means N_w increases by 9000 $mm^{-1}m^{-3}$. So we do not use $mm^{-1}m^{-3}$ or $m^{-3}mm^{-1}$ as the unit of log(N_w); otherwise, the meaning of N_w increase is conversely distorted.