

Gravity waves are triggered, propagate away from the trigger location, and are ducted

Pre-existing cloud not present in wave duct

Pre-existing cloud present in wave duct

If parcels are not lifted to saturation

If $T < 0^{\circ}\text{C}$ and parcels are lifted to water saturation

Mixed-phase cloud ($T < 0^{\circ}\text{C}$ and $\text{RH}_{\text{water}} \geq 100\%$)

Ice cloud ($T < 0^{\circ}\text{C}$, $\text{RH}_{\text{ice}} \geq 100\%$, $\text{RH}_{\text{water}} < 100\%$)

Liquid cloud ($T > 0^{\circ}\text{C}$ and $\text{RH}_{\text{water}} \geq 100\%$)

If $T < 0^{\circ}\text{C}$ and parcels are lifted to ice saturation

If $T > 0^{\circ}\text{C}$ and parcels are lifted to water saturation

Parcels are not lifted to water saturation

Parcels are lifted to water saturation

No change in clouds or precipitation

Ice nucleation and vapor deposition in upward branches and sublimation in downward branches

Water nucleation and condensation in upward branches and evaporation in downward branches

Riming in upward branches

If particles grow to precipitation-size and fall out, then those changes are irreversible (net loss of total water in parcel)

Ice mass added by riming may not be exactly reversed in downward branches (net gain of ice water content)