



## **Electron density increase due to QEF and comparison between the reference height lifetime and the VLF signal perturbations**

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In this contribution we will present a new result on the atmospheric ionisation due to QEF by considering the real values of the electric field breakdown. Since the reference height of the VLF signal propagation is at 87 km, the numerical results showed that the ionisation started at 86 km and below for a lower QEF amplitudes. The reference height build-up time decreases to the stationary value of 20ms in agreement with the recorded early/fast VLF signal perturbations. For QEF values greater than 35 V/m the ionisation increase drastically and therefore the reference height is formed at lower altitudes (80 and 78 km). Since multiple reference heights are formed and are capable to reflect the VLF signal, the corresponding signal perturbation time recovery is then the sum of all lifetimes of the reference heights.