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Possible variations of E-layer electromagnetic fields by acoustic waves above earthquake preparation regions

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The many-fluid magnetohydrodynamic theory is applied to describe the modification of the electromagnetic field of the ionospheric E-layer by acoustic-type waves. These waves originate from lower altitudes and may be caused by earthquake preparation processes. In comparison to former works, the different stratification of the positively and negatively charged ionospheric particles and of the neutral constituents is taken into account. There also the influence of the mean electric field on the different hight scales of the plasma parameters is discussed. Besides, the hight scales of the electric and magnetic wave fields are modeled. It is shown that at E-layer altitudes the acoustic waves may be converted into Alfvén waves. The dependence of these waves on the height scales of the plasma parameters of the particles and on the momentum transport between the charged and neutral particles is analysed. First estimates of the temperature variations within the E-layer because of the assumed acoustic-type waves of seismic origin are made.