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The radiative transfer equation inversion sensitivity to the spectral channel instability for the high-resolution infrared radiometers.

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The contemporary IR high-resolution multi-channel radiometer such as AIRS or IASI allows retrieving essential atmospheric and surface characteristics. Unfortunately, these instruments are highly subjected to the spectral channel stability, which drifts during operation. In the work the forward and the inverse problem sensitivity is studied. The two types of inversion were applied - the linear - Optical Interpolation and non-linear - Variational assimilation (1D-Var). The numerical experiment illustrates that the measured radiation, the retrieved SST, atmospheric temperature and humidity profiles are significantly influenced by the instability. The two approaches suggested to overcome the problem, first based at shift-sensitive measurement channel filtration and another on inversion technique weights recalibration. The numerical simulations illustrate the feasibility of RTE inversion without significant lost of the accuracy.