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Квазигауссовские модели стохастической структуры атмосферной облачности

Stochastic quasi-Gaussian models of atmospheric clouds

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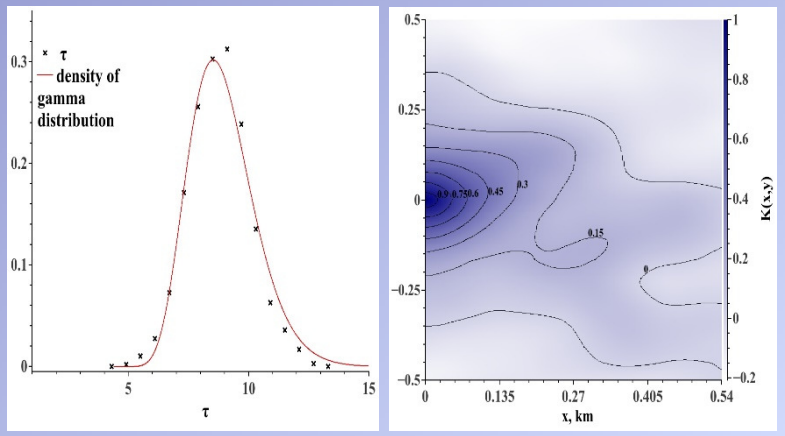
Estimation of optical thickness field parameters and simulation methods



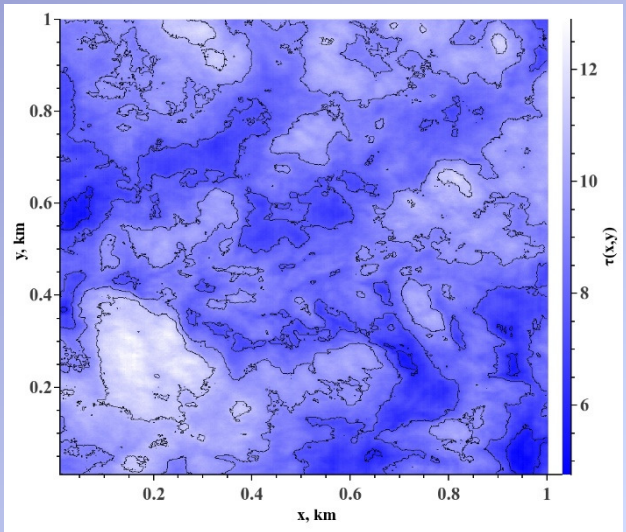
Estimation of one-dimensional distribution density and its approximation by Gamma-distribution (left) and estimation of autocorrelation function (right) for Stratus optical thickness field

Schafer M., M., et al. [10]. 2017, https://doi.org/10.1594/PANGAEA.874798

1. Model of homogeneous non isotropic stochastic field
   a) Method of inverse distribution functions (Z.A.Piranashvili, 1966)
   b) Method of “conditional distribution functions” and vector autoregressive scheme for Gaussian field simulation

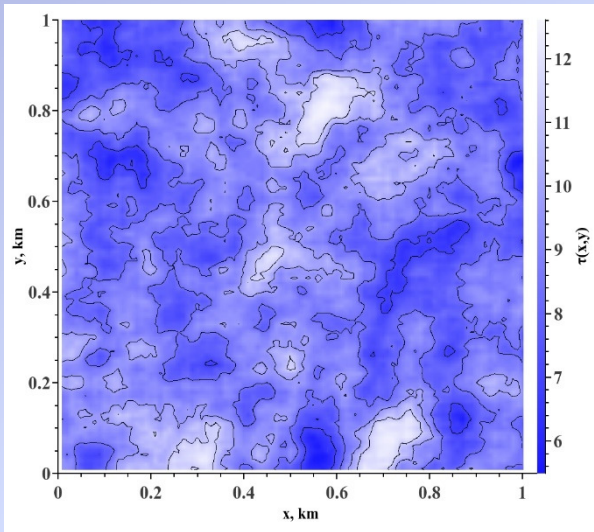
2. Spectral model of homogeneous isotropic stochastic field with one-dimensional Gamma-distribution
   a) Special nonlinear transformation of Gaussian field
   b) Spectral model of homogeneous isotropic Gaussian fields

Measured field of stratus optical thickness and simulated field implementations



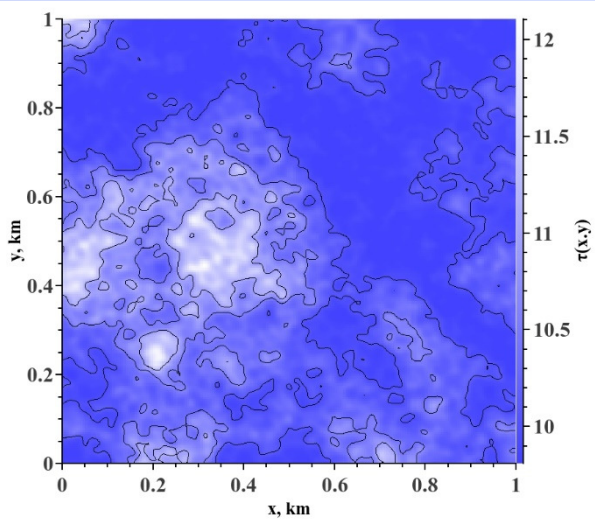
Measured field

Schafer M., M., et al.[10] 2017, https:// doi.org/ 10.1594/ PANGAEA.874798



Model 1

Autoregressive scheme and method of inverse distribution functions



Model 2

Spectral model and special nonlinear transformation

Conclusion

The computation results show that the considered numerical methods for the stochastic field simulation (autoregressive schemes, spectral models, nonlinear transformations of Gaussian functions) can be effective in reproducing geometrical and optical properties of the stratus atmospheric clouds. It is planned to use the above results to study the effects of clouds on gravity currents in the atmosphere.

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