MATHEMATICAL MODEL OF THERMAL PROCESSES IN COMETARY NUCLEI; Natalia V. Seregina, Geological Faculty, Moscow State University, Moscow, U.S.S.R.

A physical and mathematical model of a cometary nucleus is discussed. The following two phase change processes are the main influences in the model:

1. sublimation from the nucleus surface; and
2. phase transition of amorphous ice into crystalline ice (1).

The processes are described mathematically by the non-linear Stefan problem with a boundary condition of the 3rd type. This model extends the approach of previous authors (2,3,4). An enthalpy method with smoothing of coefficients was chosen for solving the 2-dimensional problem. The enthalpy approach allows the addition of as many phase transition fronts in the model as there can appear, even unpredictable fronts. This approach was successfully used by the author for solving multi-frontoral phase transition problems of the interaction of frozen soils and gashydrate stores in the case of the Earth (5). An implicit scheme was chosen for discretization in time.

References

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