Information-computational system "Atmospheric radiation". New section for modified radiation code.

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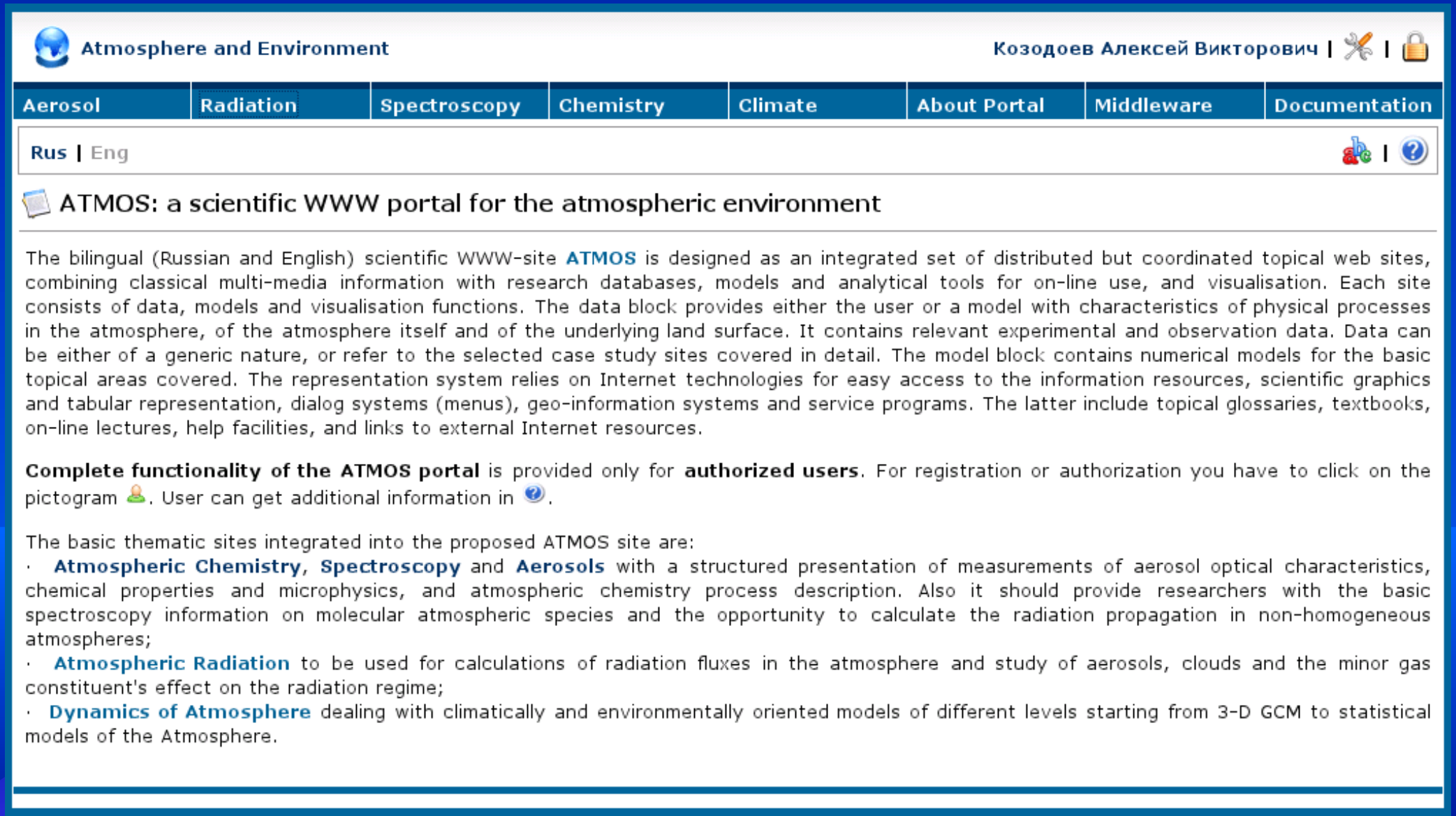
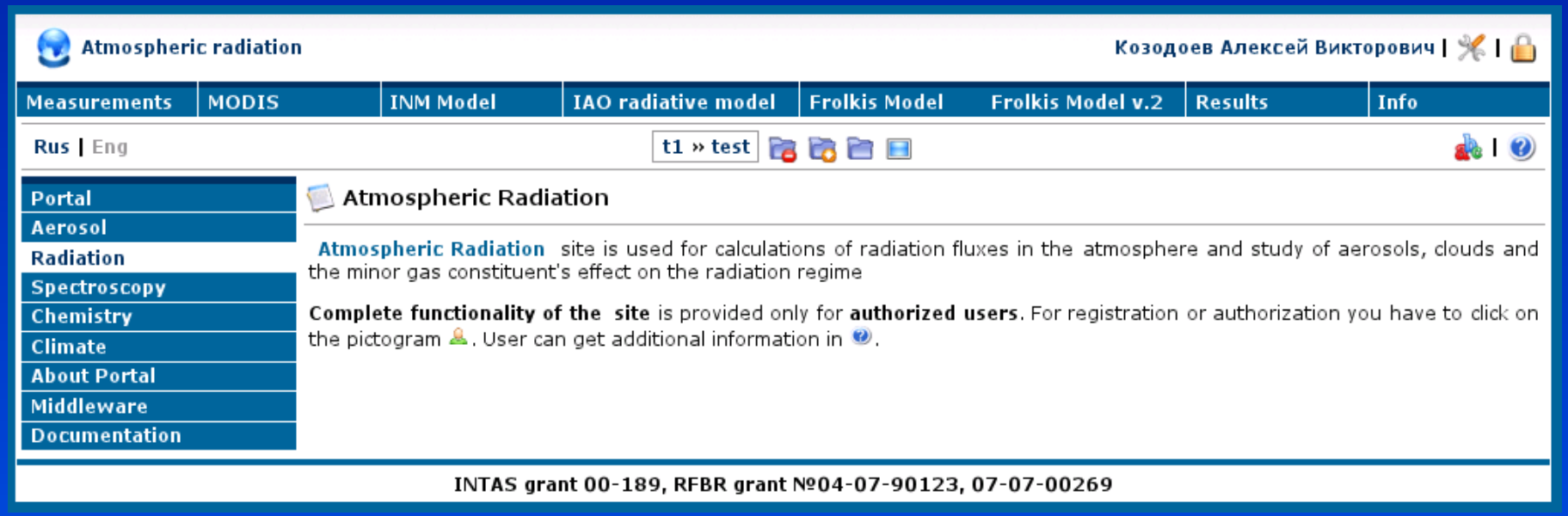
Web portal ATMOS



Atmospheric Radiation



- Photometers' measurements data
- Statistical characteristics of cloud and aerosol are obtained from the observation of MODIS
- Radiation block of climatic model of the Institute of Computational Mathematics RAS
- Radiative model of the Institute of Atmospheric Optics
- The radiative convective model (Frolkis' model)

The Radiative Convective Model

The Radiative Convective Model of the climate system is a zonally and annually average steady state model. The atmosphere is divided into layers in vertical, top of the atmosphere is assumed to be at the level of 0.3 mbar. The vertical distribution of the atmospheric temperature is determined by the radiative–convective equilibrium; whenever the vertical temperature profile is calculated to have a supercritical lapse rate, it is replaced by a critical one. The replacement of the temperature lapse rate leads to a change in the heat content of the troposphere, which is restored in accordance with the energy conservation law: in the climate system, at top of the atmosphere, the globally and annually average fluxes of incoming and outgoing radiative energy are equal.

The Radiative Convective Model

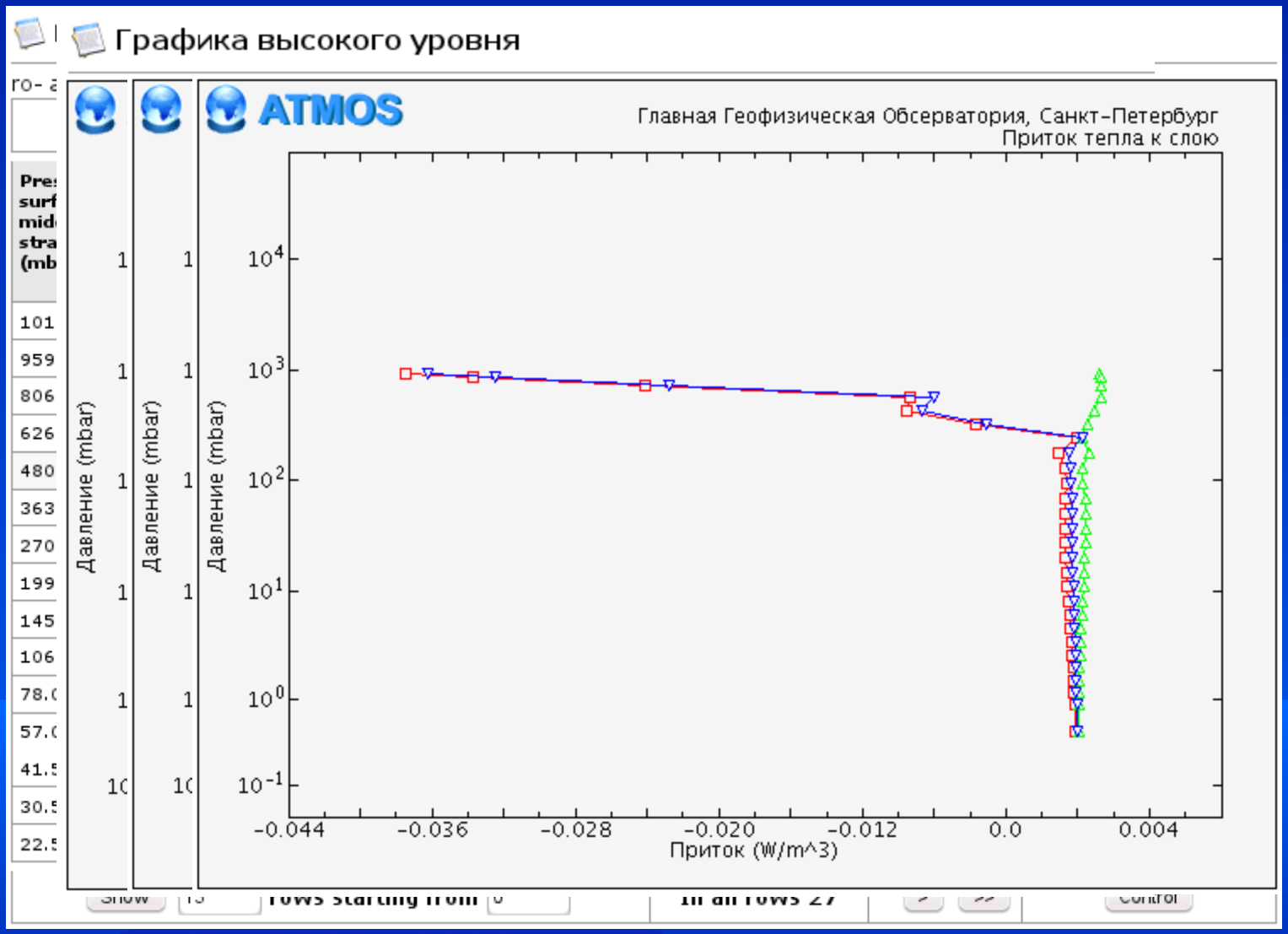
- Frolkis V.A., Rozanov E.V., Radiation Code for Climate and General Circulation Models // In : IRS'92 Current problems in Atmospheric Radiation. / Ed. S.Keevallik. A.DEEPAK Publishing., Hampton, VA 23666, U.S.A., 1993, C. 176-179.
- Киселев А.А., Фролькис В.А., Эволюция термического режима атмосферы в условиях прогнозируемого антропогенного загрязнения // Известия РАН. Серия Физика атмосферы и океана, 1994, Т. 30, № 4, С. 582-587.
- Розанов Е.В., Фролькис В.А., Оценка влияния температурной зависимости функции пропускания в ИК диапазоне на чувствительность климатических моделей // Известия РАН. Серия Физика атмосферы и океана, 1993, Т. 29, № 4, С. 509-514.
- Фролькис В.А., Киселев А.А., Кароль И.Л., Диагностика антропогенных изменений климата моделированием радиационно-фотохимических процессов в атмосфере // Известия РАН. Серия Физика атмосферы и океана, 1999, Т. 35, № 4, С. 444-456

New section for modified radiation code

Aerosol Parameters Assignment

# layer	Optical depth of aerosol layer			Aerosol single scattering albedo		Aerosol asymmetric factor	
	IR	NIR	UV+Visible	NIR	UV+Visible	NIR	UV+Visible
1	0.01	0	0	0.998	0.998	0.51	0.51
2	0.01	1	1	0.998	0.998	0.51	0.51
3	0.01	0	0	0.998	0.998	0.51	0.51
4	0.01	1	1	0.998	0.998	0.51	0.51
5	0.01	1	1	0.998	0.998	0.51	0.51
6	0	0	0	0	0	0.51	0.51
7	0	0	0	0	0	0.51	0.51
8	0	0	0	0	0	0.51	0.51
9	0	0	0	0	0	0.51	0.51
10	0	0	0	0	0	0.51	0.51
11	0	0	0	0	0	0.51	0.51
12	0	0	0	0	0	0.51	0.51
13	0	0	0	0	0	0.51	0.51
14	0	0	0	0	0	0.51	0.51
15	0	0	0	0	0	0.51	0.51

New section for modified radiation code



New section for modified radiation code

Initial Conditions

General initial c
Number of layers in the atmospl
Earth surface albedo
Take into account the radiative-
Take into account the cloudines
Take into account the aerosol
Take into account Sun (Specification of averaging inter
Latitude (°)
Initial date
Final date

Initial Conditions

General initial conditions	
Number of layers in the atmosphere (=<45)	26
Earth surface albedo	0.17
Take into account the radiative-active gases	☑
Take into account the cloudiness	☑
Take into account the aerosol	☑
Take into account Sun (Specification of averaging interval)	☑
Latitude (°)	60
Initial date	Day Month 20 10
Final date	Day Month 25 10
Calculation variant	◉ Only radioactive fluxes and affluxes are calculated ○ Only radiance balance point is calculated ○ Only radiation temperature is calculated
Moisture preservation mode	○ Absolute humidity is preserved ◉ Relative humidity is preserved
Vertical critical temperature gradient at the calculation of the convective accommodation	○ Adiabatic humidity gradient ○ Standard gradient (6.5 degrees/km) ○ Adiabatic dry gradient ◉ User defined gradient
gradient value	-6
Define surface temperature (otherwise calculated)	☐
Surface temperature (K°)	
Absolute precision of temperature calculation	0.01

Thank you

for your attention !