Classification method of spatio-temporal behaviour of the geophysical data fields

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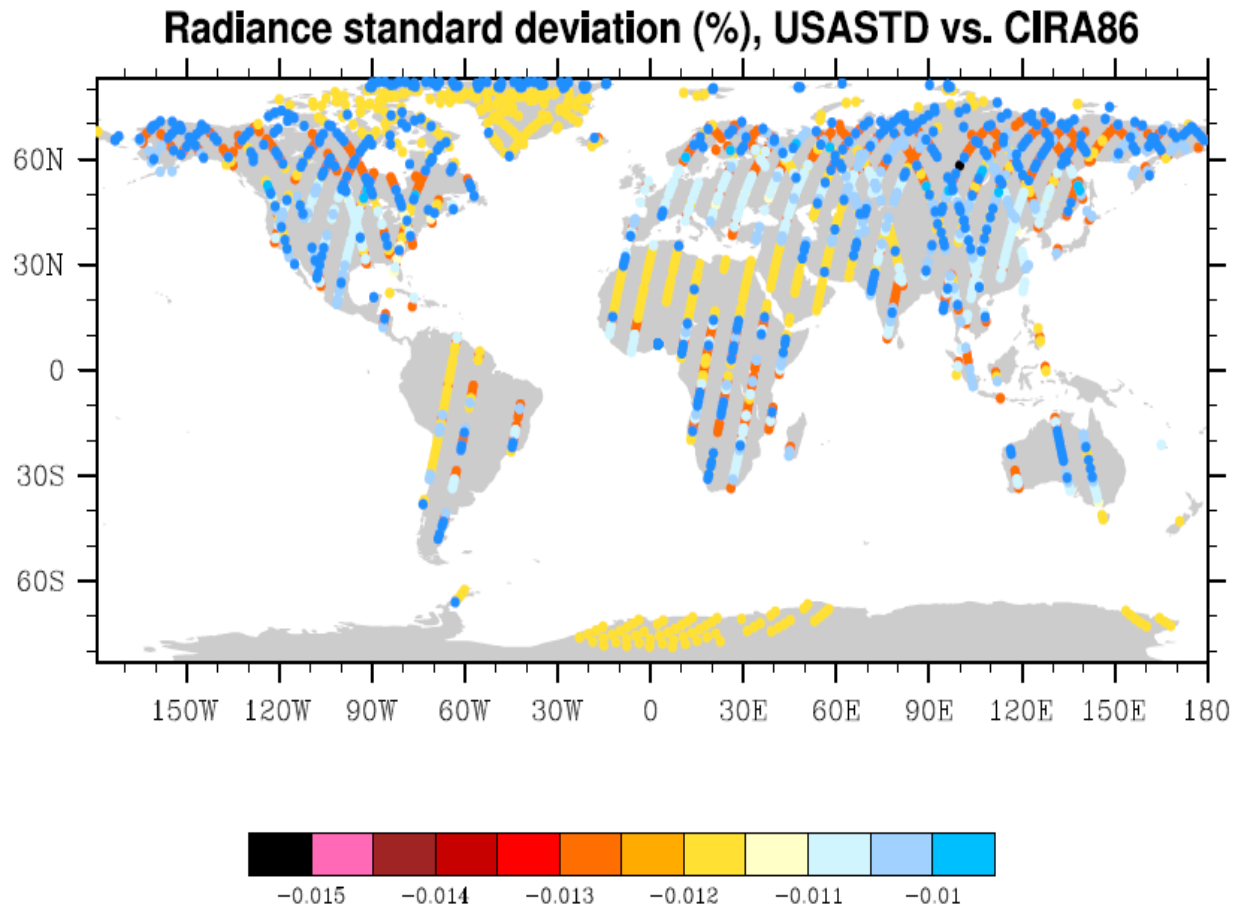** Tomsk state pedagogical university

Tasks where used spatio-temporal the geophysical data fields

[Geophysical data fields (x,y,z,t) : temperature, gases concentration, aerosol, wind…]

1) Solar radiative transfer;

2) Neural network tutoring;

Modeling of the satellite signal with different temperature models.

Radiance standard deviation (%), USASTD vs. CIRA86

Approach to classification

1) Euclidean metric $D_{ij}^{\ E} = [(x_i^l - x_j^l)^2]^{1/2} / D_{max}$

2) The algorithm of detecting structure can be described in a language of graph theory. Compare with each facility the top of some graph G, and fin (Xi,Xj) associating top Xi and Xj as of cost write the quantity, equal to the separation Dij between corresponding by objects in space **X**. If now consistently to withdraw from fin graph with great significances Dij, then, beginning from some Dp=Dmax, the source graph will become by the incoherent.

3) The following cutback of threshold Dp tend to increase component count of coherence. Each such the subgraph can be characterized as two threshold values of D: - Dmax threshold importance, in which this subgraph is separated from other graph; and - Dmin threshold importance, in which of this subgraph the one top or at once several tops goes out. So that, the value of Dmin to an extent determines the compactness degree - k-th subgraph; less this amount, those stronger communication between all data elements of cluster.
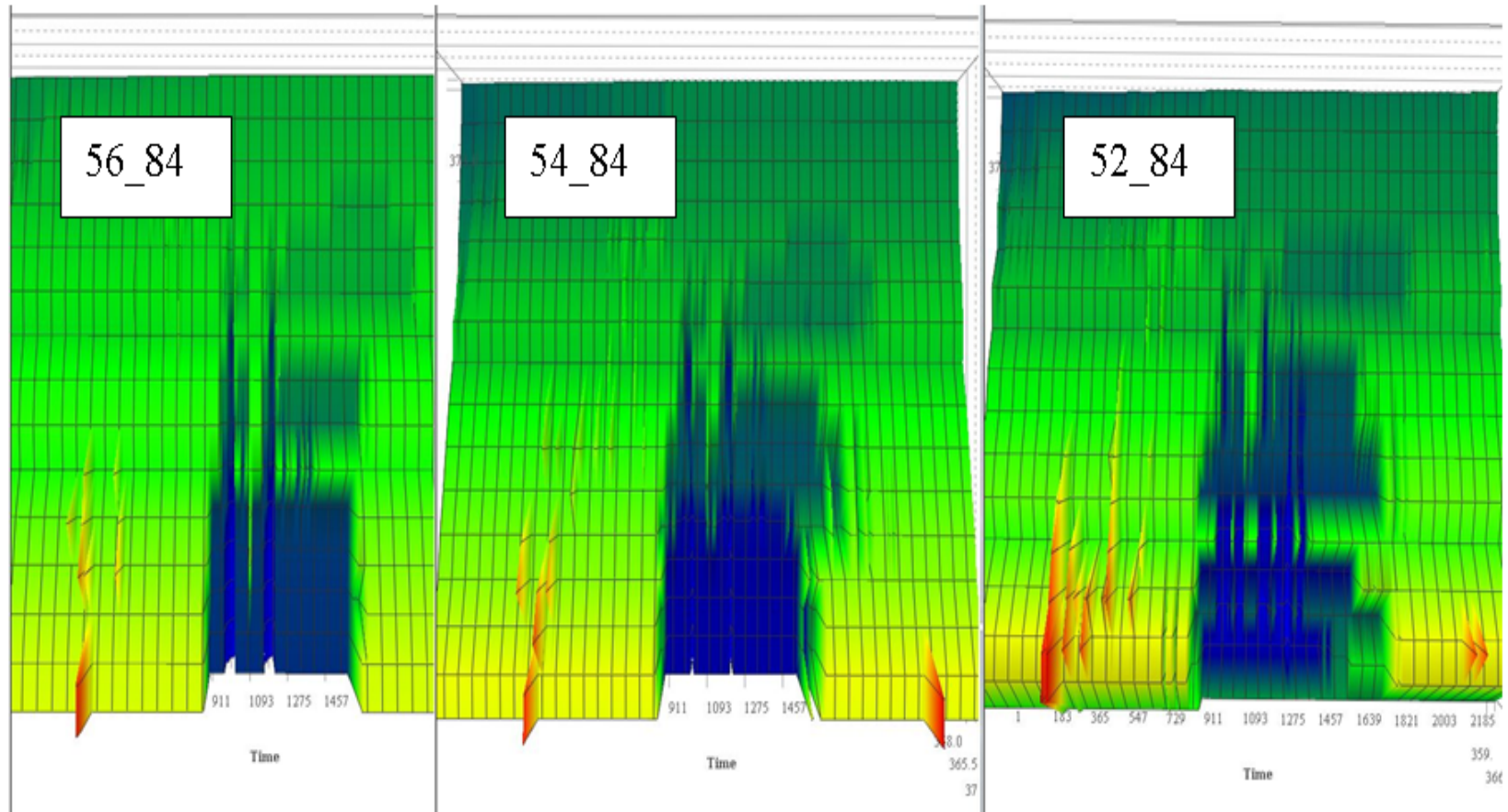
One month of the CO2 concentration on the ground level
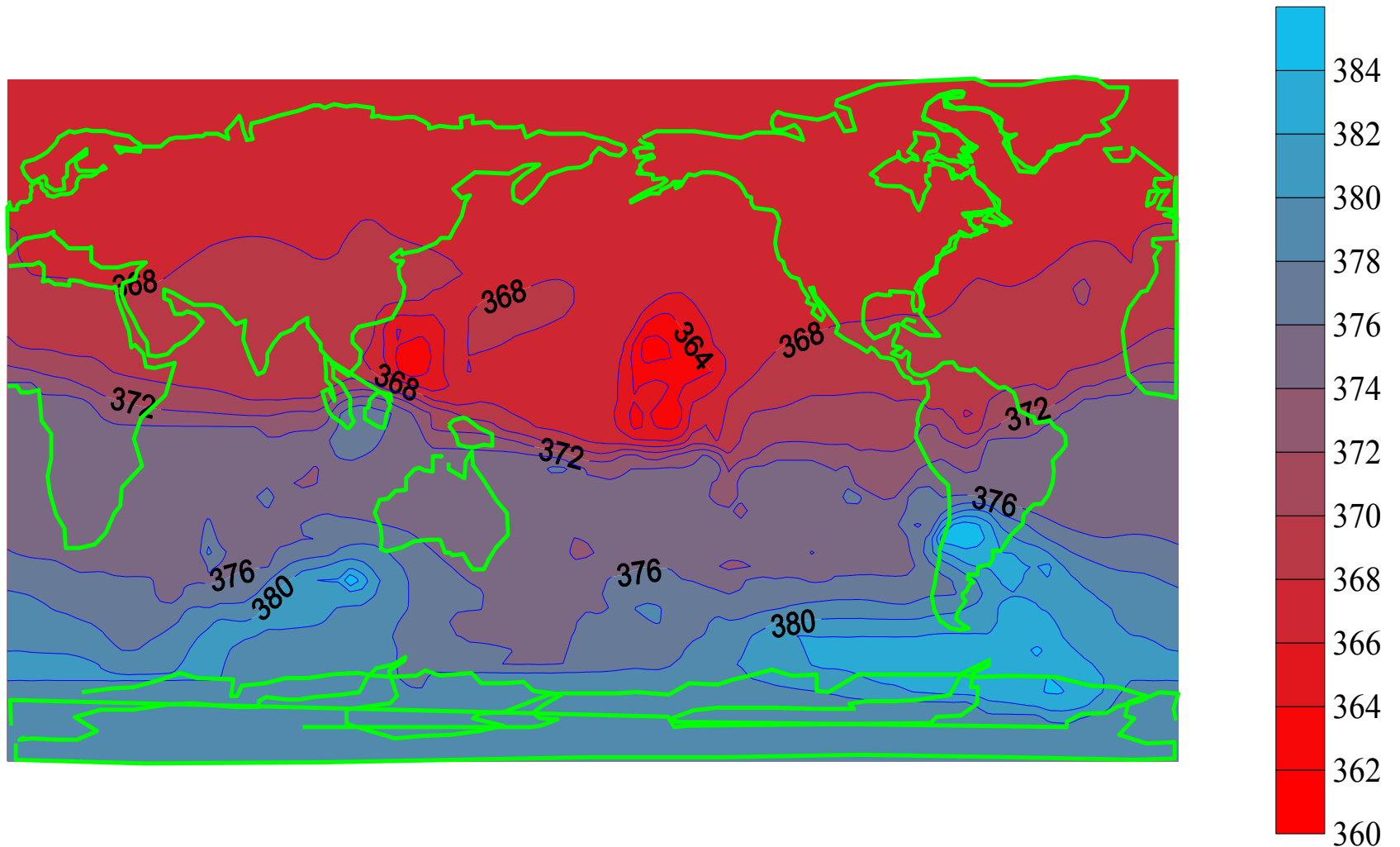
Number of classes
of the CO2 concentration

april, 2001
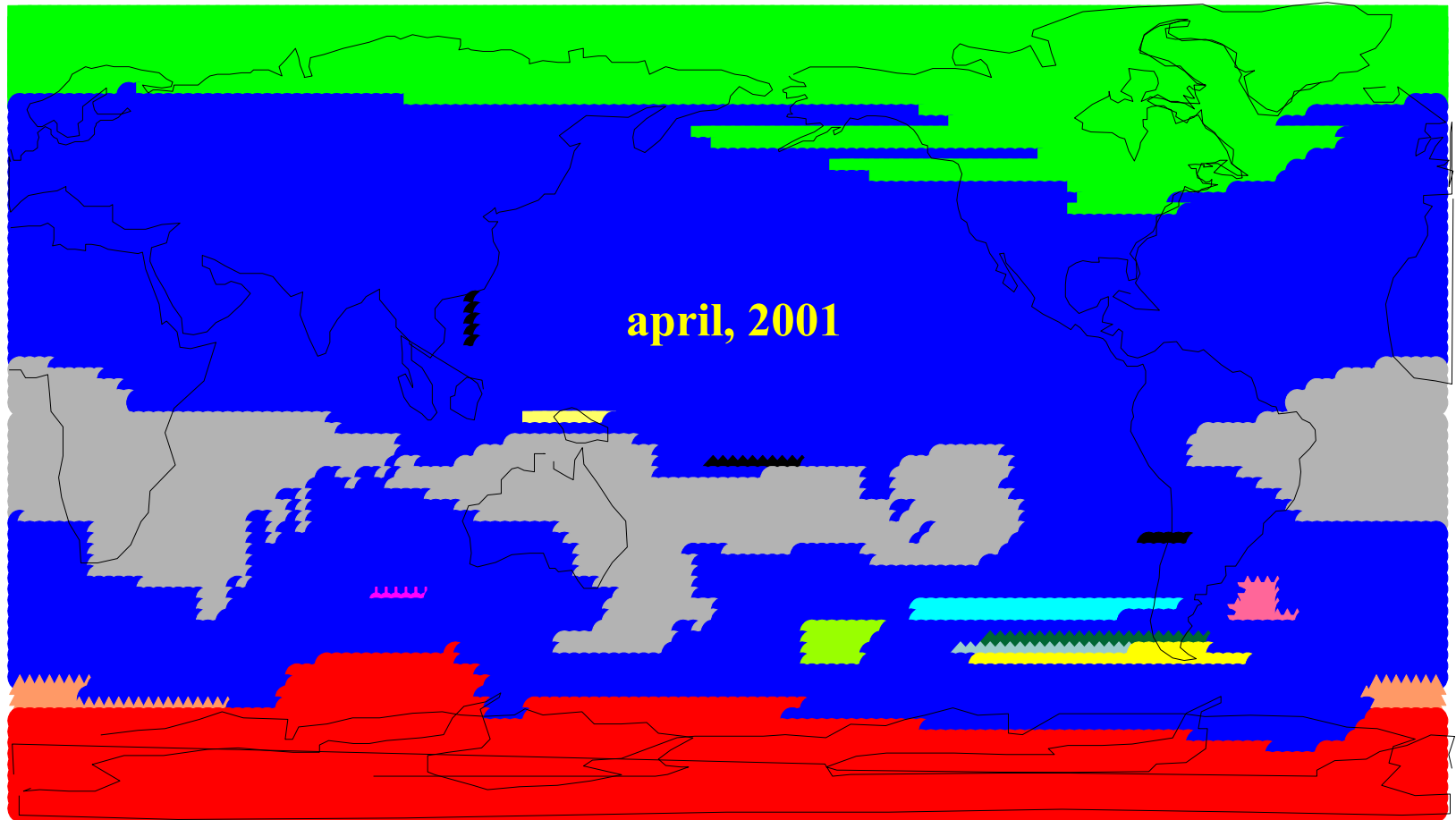
Time-spatial clusterization of the CO2

The clusterization is based on close structure analysis of matrix of the distances between objects. The algorithm is realized using of performance of graph theory.

One month of the CO2 on the ground level without mean latitude level