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Laboratoire d'Economie des Transports
Unité Mixte de Recherche du CNRS n° 5593
Université Lumière Lyon 2 - ENTPE

The correlation between Socio-economic development of the Russian Federation regions and traffic safety.

Kosheleva Polina

State Technical University – MADI

ECTRI
European Conference of Transport Research Institutes

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FERSI
Road Safety Research

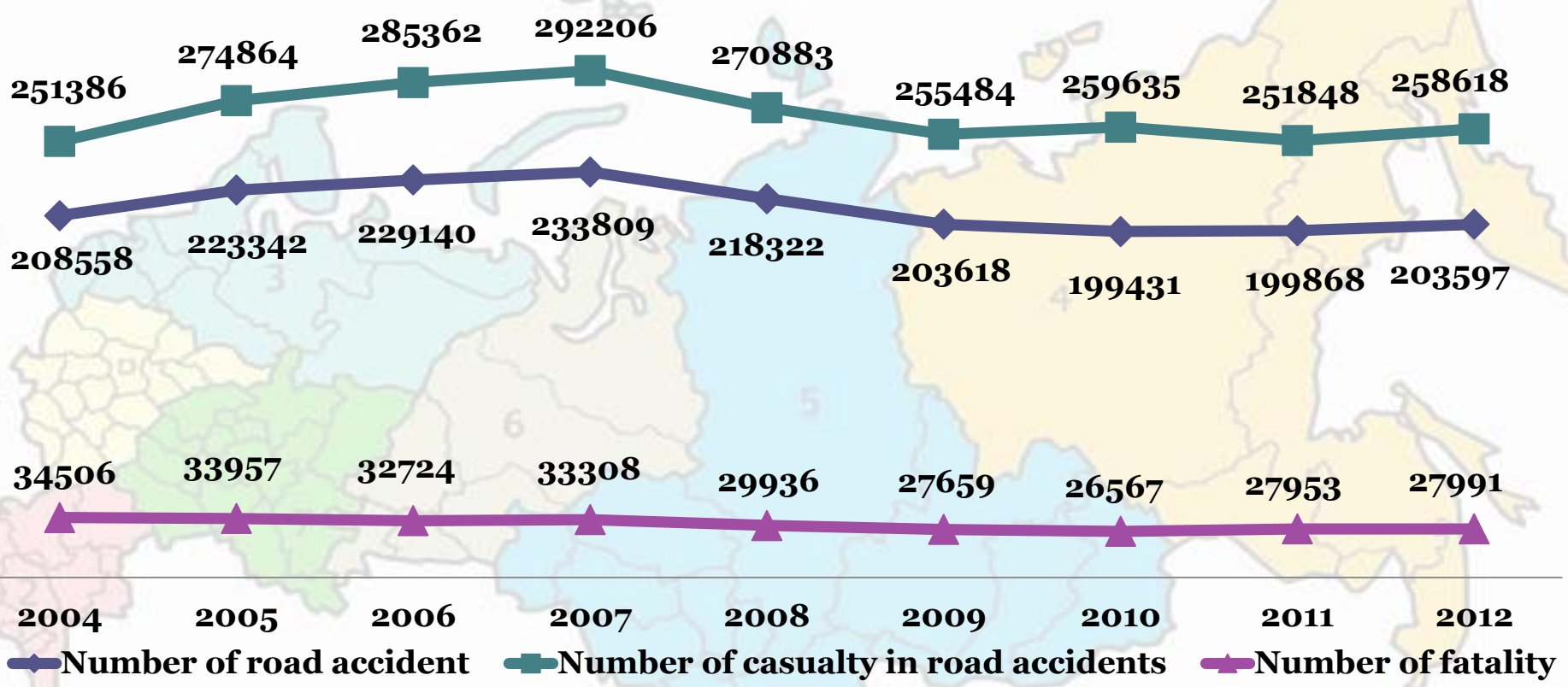
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The problem of road accidents in the Russian Federation has become particularly acute recently which could be explained by the following factors:

- the inconsistency of the road transport infrastructure with the needs of both the society and the state;
- inadequate efficiency of road safety system functioning;
- poor discipline of the road users.

Dynamics of the number of accidents, number of casulties in road accidents, number of fatalities.



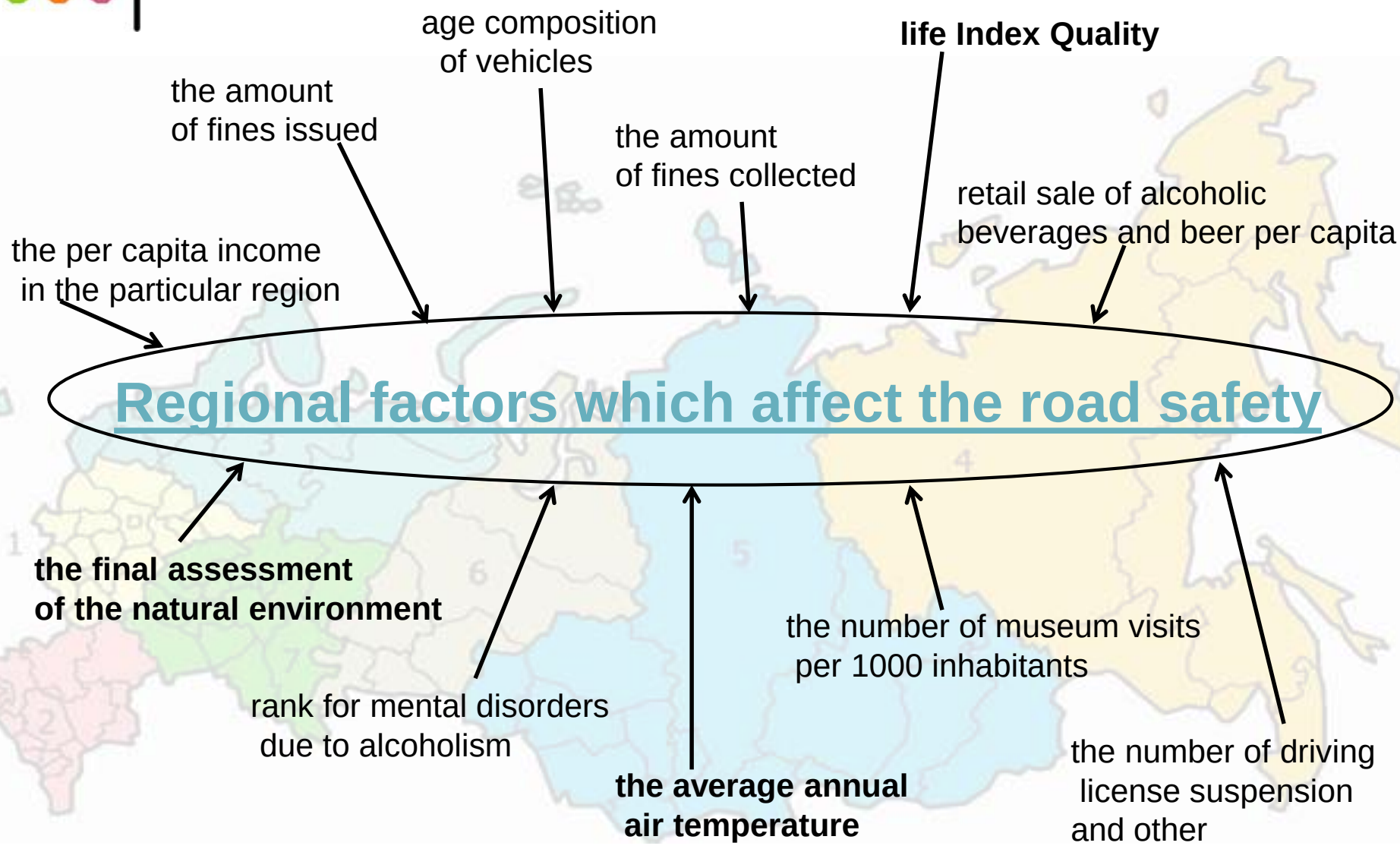
Comprehensive approach to the study of the problem road safety was chosen due to the following factors:

a) the significant deviation of regional road safety indices from the average ones for the Russian Federation;

b) the impact of the socio-economical development of the particular region on the parameters influencing the road safety.

To assess the trends in the changing of the accident rate we used the following data:

- the long term statistics accumulated by Federal State Statistics Service,
- departmental statistics of the Russian Federation traffic police,
- the results of the expert assessment of the individual factors' impact on the accident probability,
- UNICE newsletters,
- road accidents data accumulated by the Ministry of the Interior of Russia,
- materials of the special research conducted by different scientific institutions dealing with road safety.


age composition
of vehicles
life Index Quality
the amount
of fines issued
the amount
of fines collected
retail sale of alcoholic
beverages and beer per capita
the per capita income
in the particular region
Regional factors which affect the road safety
the final assessment
of the natural environment
the number of museum visits
per 1000 inhabitants
rank for mental disorders
due to alcoholism
the average annual
air temperature
the number of driving
license suspension
and other

R. Smeed's formula

$$D/N=\alpha\times(N/P)^{-2/3},$$

where:

D – is the number of deaths in road accidents;

N – is the number of registered vehicles;

P – is the size of the population;

α - the correction factor.

The number of deaths, the number of injures, the number of accidents in the Russian Federation can be approximated by the following function:

$$y_i = a_i * (x_1^{\beta_1} * x_2^{\beta_1})$$

where **x1** - is the population in the region;

x2 - is the number of vehicles;

a, β - is unknown variable

The problem of optimization was formulated as follows:

$$\sum_{j}(y_{ij}-z_{ij})^2 \rightarrow \min \qquad y_{ij} = a_i * \left(x_{1i}^{\beta} * x_{2i}^{0.5\beta}\right)$$

where:

y - is the assumed number of deaths **(i=1)**, the number of injuries **(i=2)** the number of accidents **(i=3)** related to **j** - the region;

z - is the actual values of the number of deaths **(i=1)** the number of injuries and injuries **(i=2)** the number of accidents **(i=3)** related to **j** - the region.

The standardization is based on the Smeed's formula:

$$f = 0{,}406136 * p^{0.636288} v^{0.318144},$$

$$r = 2.377382 * p^{0.677373} v^{0.338686},$$

$$dtp = 2{,}55502 * p^{0.065198} v^{0.32599},$$

Where:

f - is the number of deaths in road accidents;

r – is the number of injures in the accident;

dtp – is the number of accidents;

p – is population;

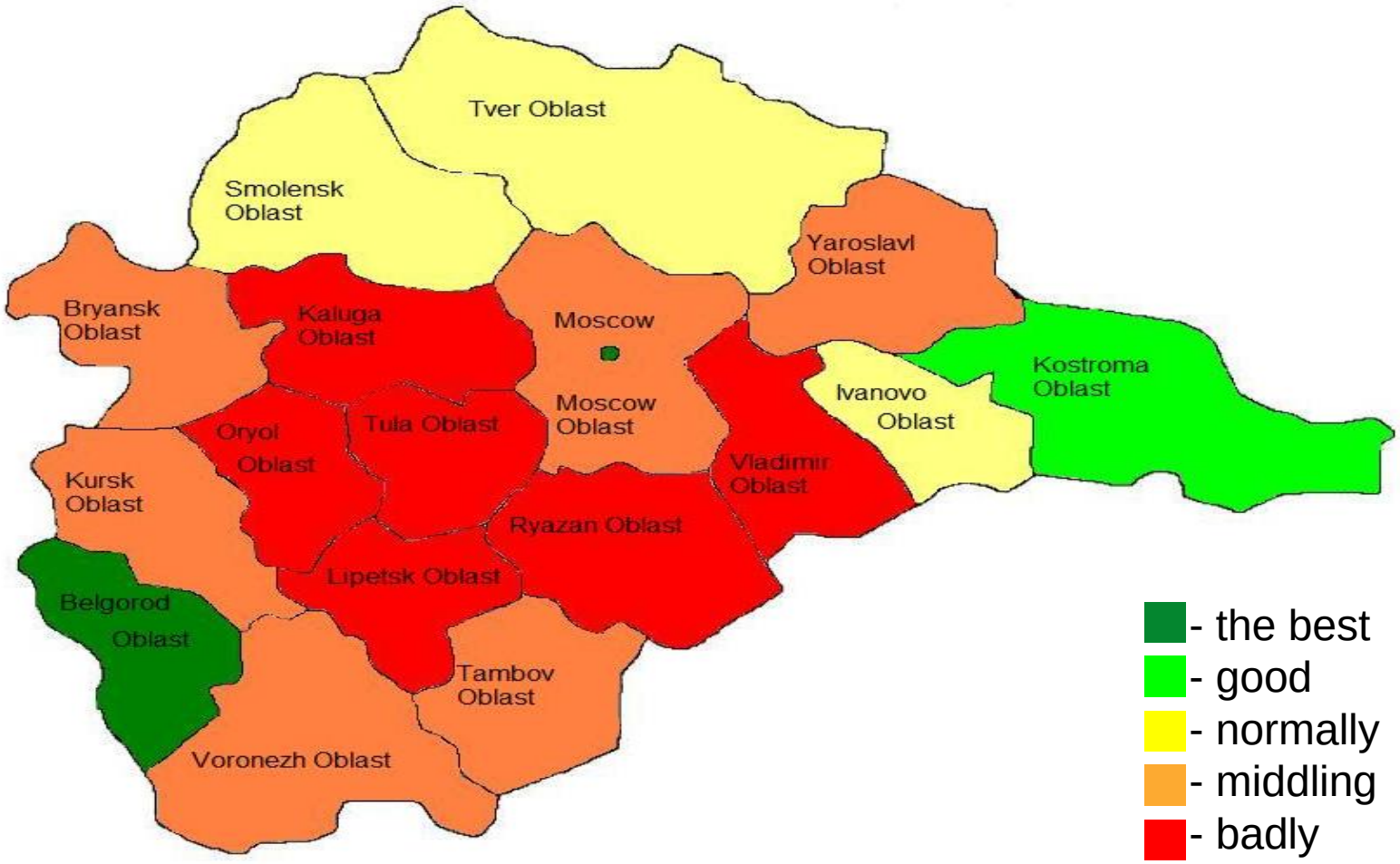
v – is the number of registered vehicles.

For the ranking of each region the following procedure was adopted:

a) the regions with the equivalent rank were determined;

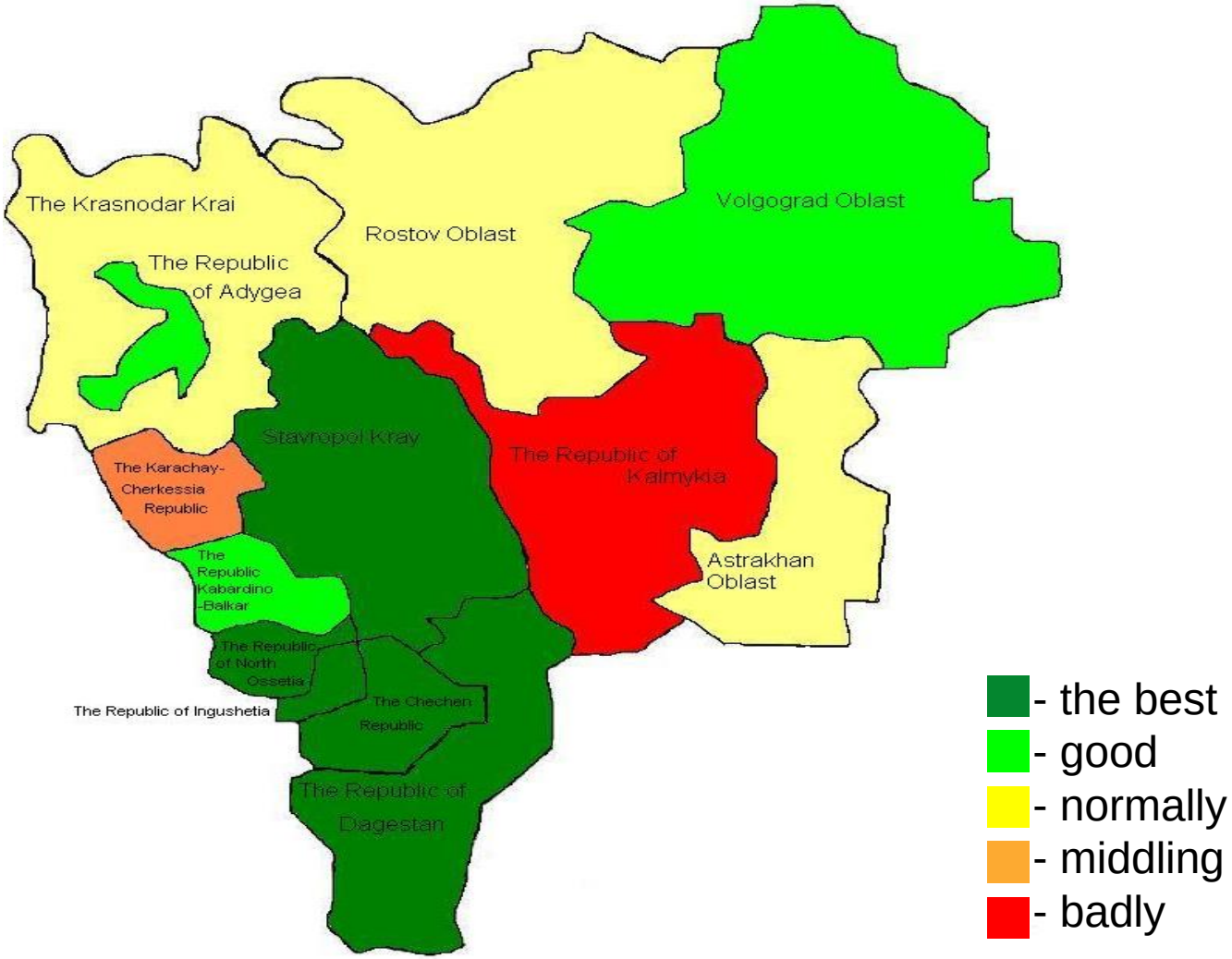
b) the equivalent regions are ranked according to the values of the most important indicator.

Central Federal District



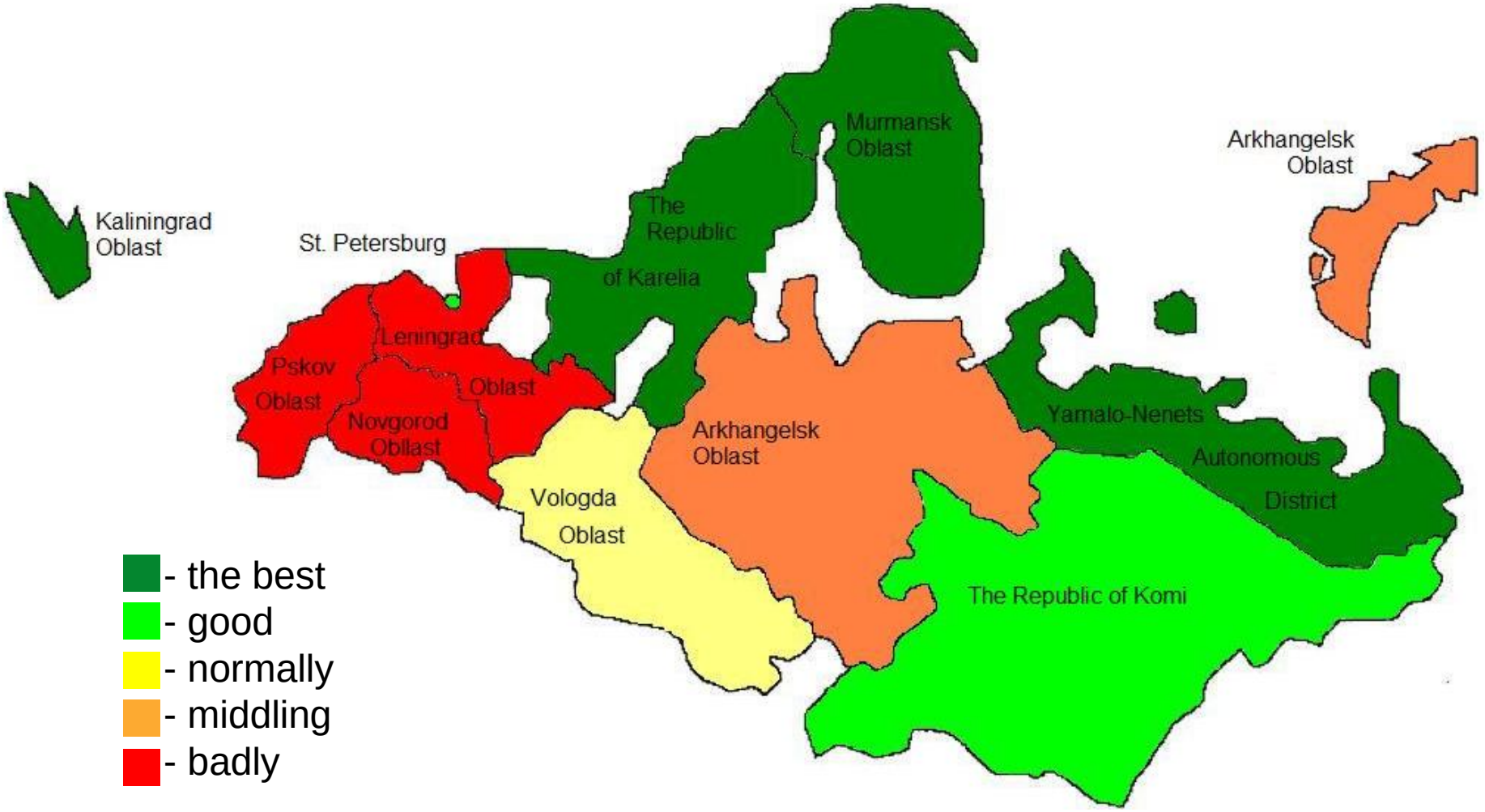
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Southern Federal District

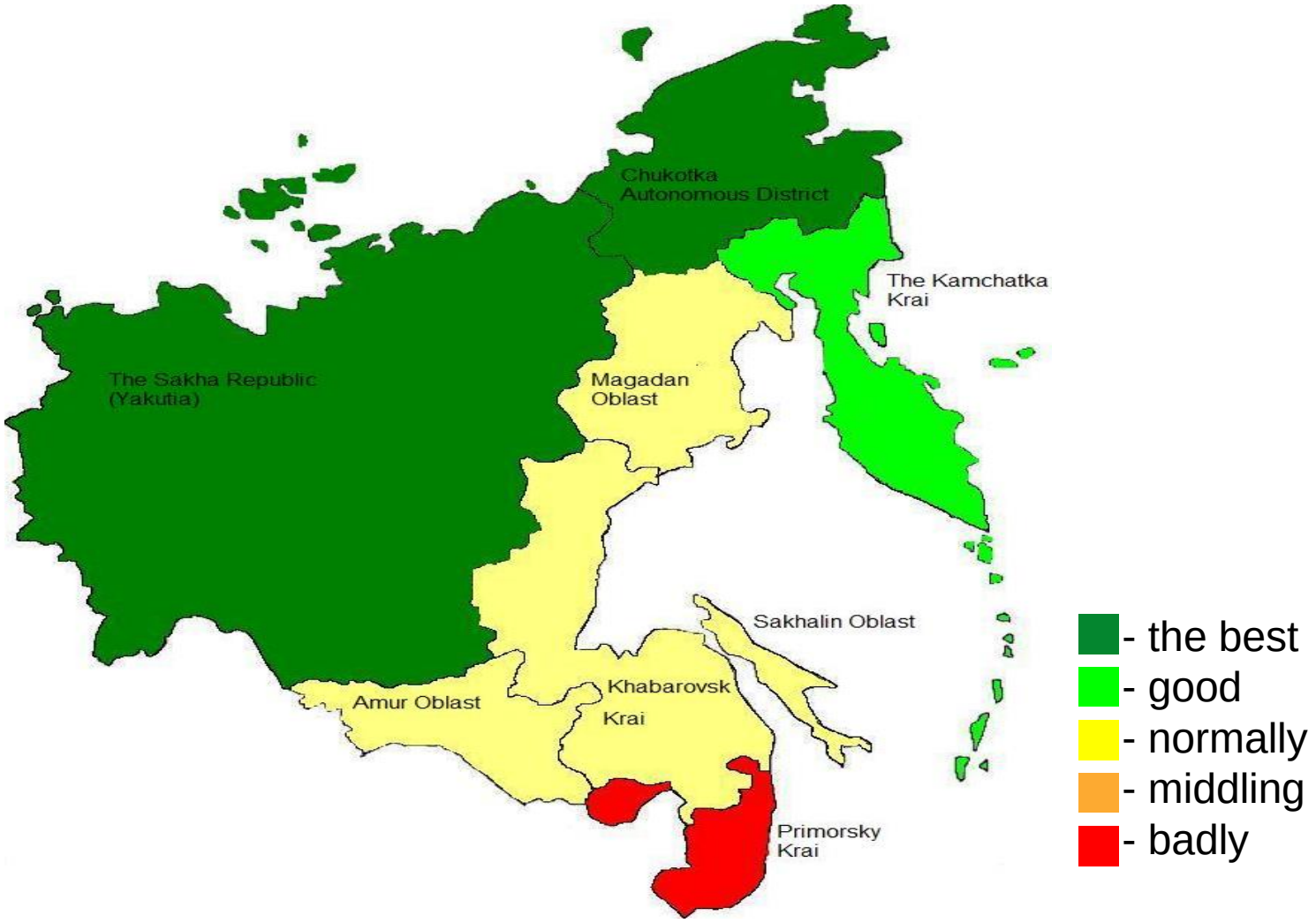


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Northwestern Federal District

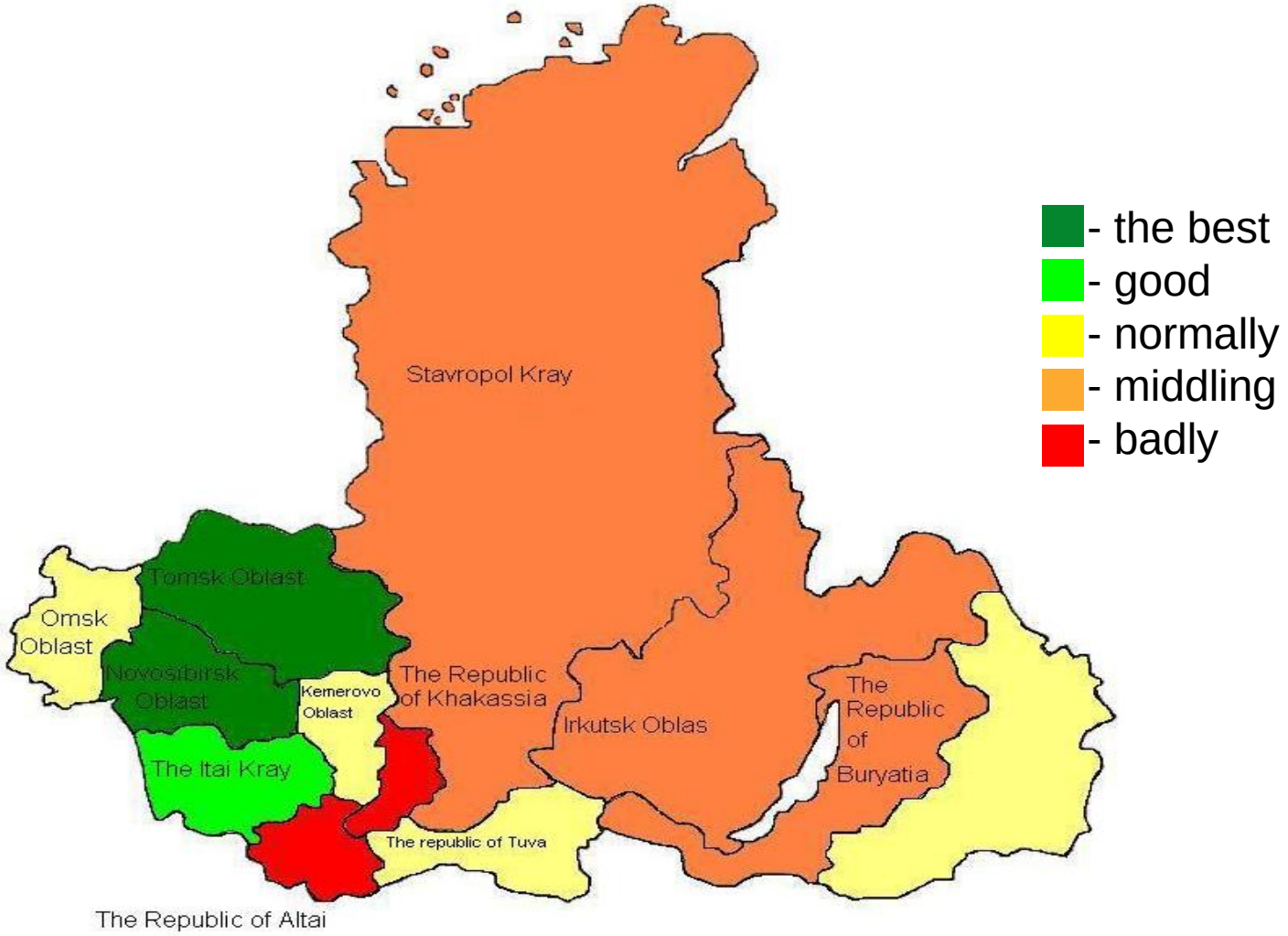


Far Eastern Federal District



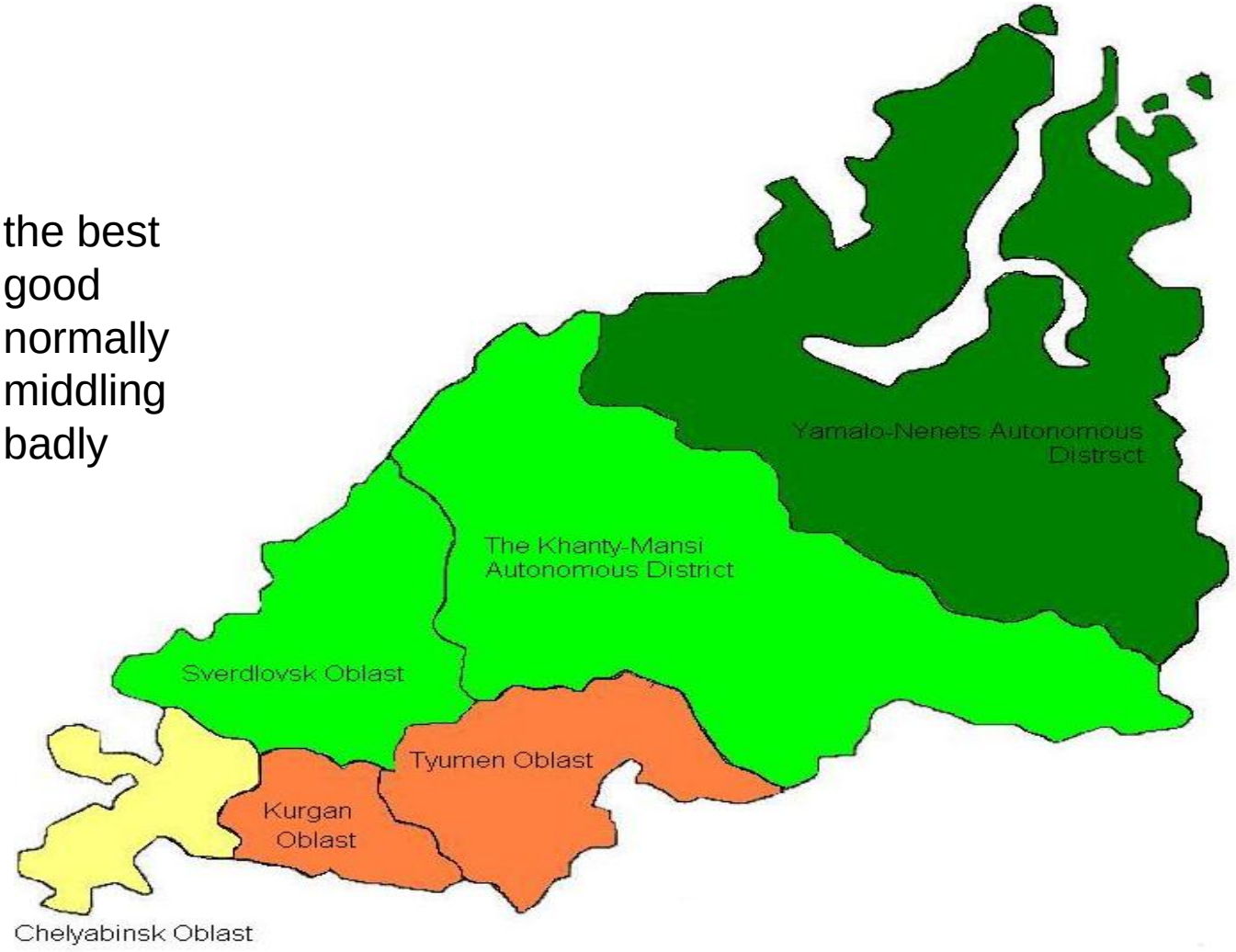
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Siberian Federal District

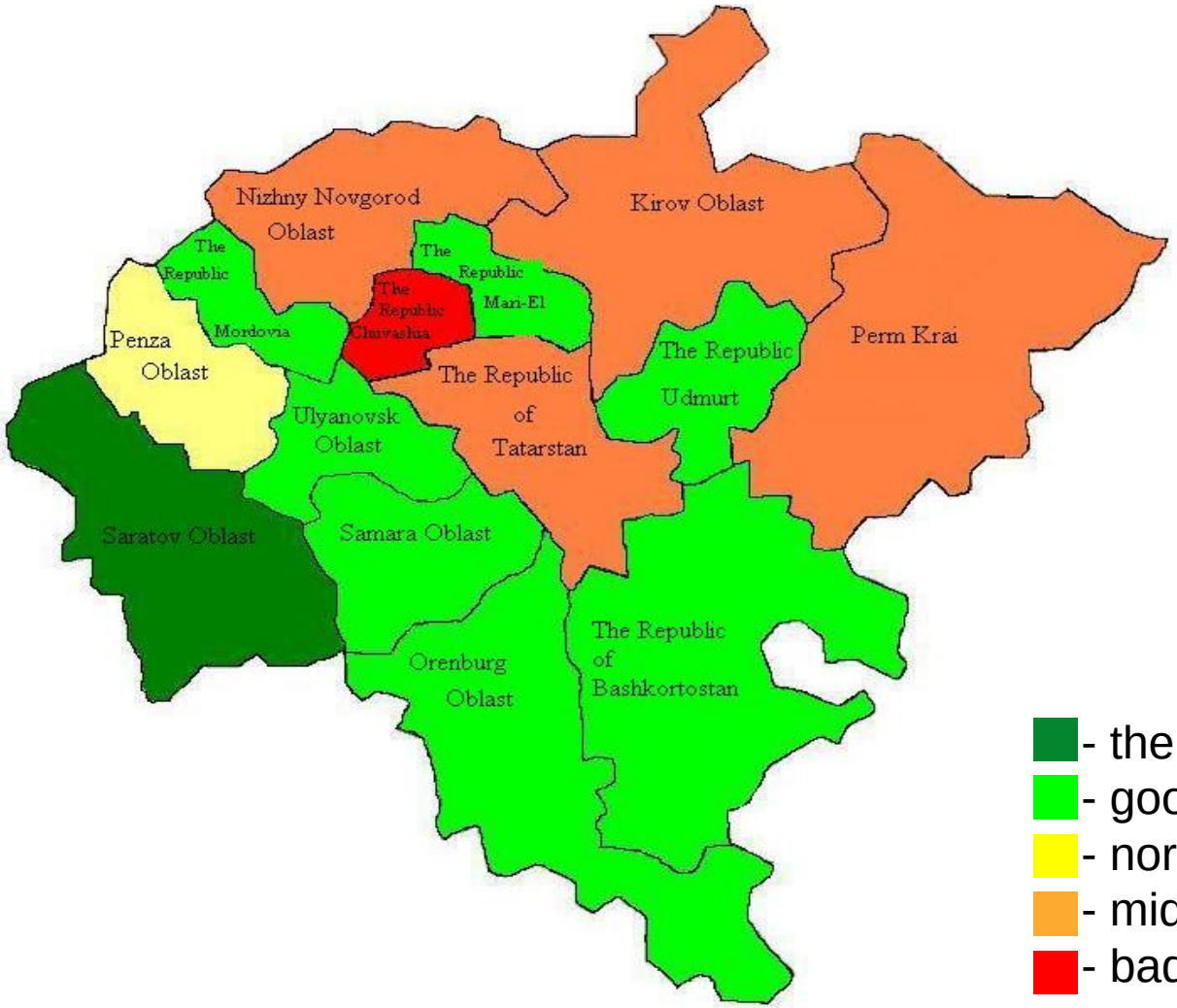


Ural Federal District

- the best
- good
- normally
- middling
- badly



Volga Federal District



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Thank you for your attention.

All your questions you can send to
Pkosheleva@list.ru