How to create the Best Suitable Map Projection

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Outline

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• Main criterion of the best suitable projection development
• Polyconic projection design
• Composite projection design
• Design principles for a map of isocols for a geodetic projection
• Maps of isocols - examples
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Introduction

- A big library of map projections is used for GIS nowadays

- The idea of the best suitable projection is state-of-the-art

- Our algorithm is an alternative to map projections used in the world

Main criterion of the development
best suitable projection

- Chebyshev-Grave criterion which corresponds to the idea of ‘ideal projection’

- The idea: isocol should be close or coincide to a boundary of the represented area
Polyconic projection design

\[ \alpha = \sqrt{1 + \frac{1 - (b/a)^2}{1 + (b/a)^2} \cos^2 B_0} \]

Composite projection design

\[ k_1 = k_2 = 0.5 \]

<table>
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<tr>
<th>Point ID</th>
<th>X m</th>
<th>Y m</th>
<th>m</th>
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</tbody>
</table>

Point ID \[ B_0 = \frac{B_L + B_S}{2} \] \[ L_0 = \frac{L_W + L_E}{2} \]

change coefficients \( k_1 \) and \( k_2 \) until \( m_N = m_N \)

change \( B_0 \) until \( m_N = m_N \)

change \( L_0 \) until \( m_W = m_E \)
Design principles for a map of isocols for a geodetic projection

\[ m = m_0 + \frac{k_1 \Delta X^2 + k_2 \Delta Y^2}{2m_0 R_0^2} \]

\[ \Delta X = X - X_0 \]
\[ \Delta Y = Y - Y_0 \]
\[ R_0 = \frac{c}{Y_0} \]

About 30% of the territory is represented with distortions less than 1/5000 and about 90% of the area has distortions less than 1/2500. Only negligible part of the territory has distortions about 1/2000.
Discussion and conclusions

• Only one general form of equation for calculation coordinates in any projection

• No problems with transformation issue between coordinate systems

• Management of a character of distortions in a projection by a map of isocols
Thank you for attention!!!

- Questions and discussion