



FIG'08 Stockholm

How to create the Best Suitable Map Projection

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Outline

- Introduction
- 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
- Discussion and conclusions

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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

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Main criterion of the development best suitable projection

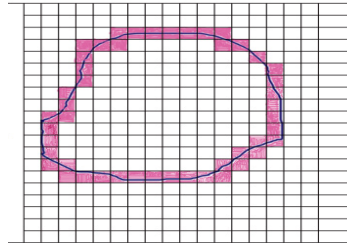
- Chebyshev-Grave criterion which corresponds to the idea of ‘ideal projection’
- The idea: isocol should be close or coincide to a boundary of the represented area

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Polyconic projection design



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

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Composite projection design



$$k_1 = k_2 = 0,5$$

Point ID	X, m	Y, m	m	y, °
N	5925860,8700	99666,0573	1,00020	1,1943645
S	5624613,5409	50585,4382	1,00015	0,5602523
W	5696614,5401	-134590,8561	1,00015	-1,5181876
E	5898688,4608	128087,4679	1,00019	1,5236767

change coefficients k1 and k2 until $m_S = m_W$

change B0 until $m_N = m_S$

change L0 until $m_W = m_E$

Point ID	B	L
N	53°27'	6°49'
S	50°45'	6°02'
W	51°23'	3°23'
E	53°12'	7°14'

$$B_0 = \frac{B_N + B_S}{2} \quad L_0 = \frac{L_W + L_E}{2}$$

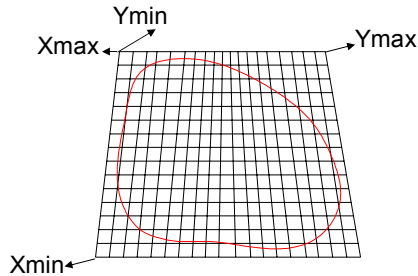
Point ID	X, m	Y, m	m	y, °
N	5925781,9152	96341,6691	1,00017	1,1557204
S	5624578,6594	47057,2383	1,00017	0,5214321
W	5696708,6470	-138072,8820	1,00017	-1,5584496
E	5898601,1353	124744,0922	1,00017	1,4853639

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Design principles for a map of isocols for a geodetic projection



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

$$\Delta X = X - X_0$$

$$\Delta Y = Y - Y_0$$

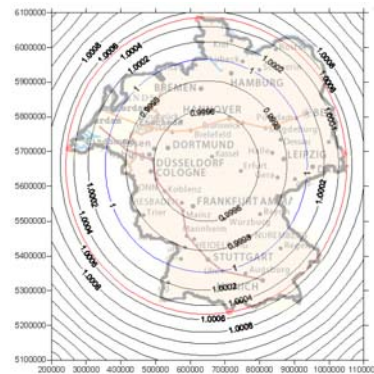
$$R_0 = \frac{c}{V_0}$$

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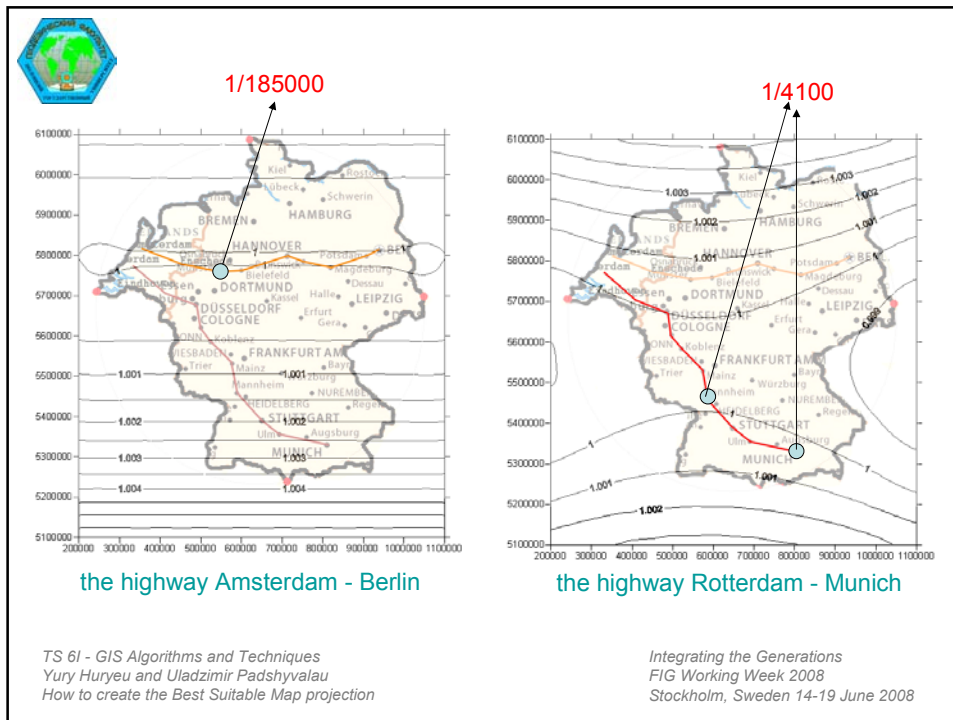
The maps of isocols - examples



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.

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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

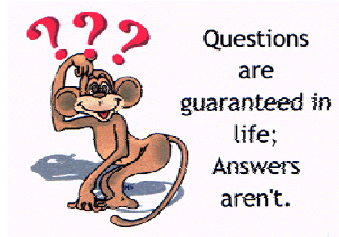
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Thank you for attention!!!

- Questions and discussion



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