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- The main aim was to update the norm for the design of roads and traffic areas loaded with non-rail traffic and climatic effects.
- The main output are three maps for the periodicity n = 0.10; n = 0.15 and n = 0.25 and map with the average annual air temperature for the period 1968 – 2017 in Slovakia.
- Overview of the main steps for final maps :
- data preparation Average daily air temperature for the period 1968 -2017
- - Homogenization in program MASH 3.03
- - Interpolation of climate data in the GRASS GIS program 6.4.3
- map processing of interpolated data layers by ArcGIS program

From data to map

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Süber Üpany Format Zobrach Permocnik	
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1968 128 9999.99 2.60 -1.40 0.57 1.08 0.47 9999.99 9999.99 9999.99 3.13 9999.99 3.53 3.17 1.25 -0.95 1.55 -1.65 9999.99 9999.99 -2.80 -2.35 -0.93 -1.42 -1.40 9999.99 1.00 -2.35 -3.65 -2	1964 128 1.34 2.69 -1.40 0.67 0.92 0.52 2.12 1.59 1.53 3.14 3.12 3.53 3.26 1.25 -1.07 1.70 -1.68 0.22 -0.66 -2.00 -2.35 -0.93 1.42 -1.40 -1.15 1.00 -2.45 -2.25 -3.65 -2
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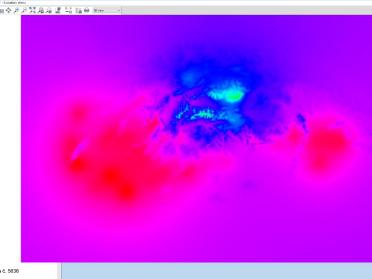
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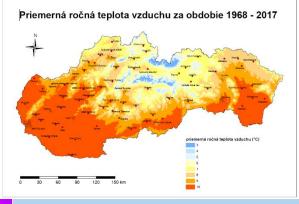
Ln 1. Col 1

Homogenized series

Data series

🖻 Verisum – P	loznámki	rvý blok										- 🗷 V	erisum – P	loznámkov	ý blok								GRASS GIS Map Display: 1 - Location: sh	territ.
	Forma	it Zobraziť P	omocnik											Formát	Zobraziť	Pomocnik								
ndex 1 11933	61	242.63	11995	94	136.11	11982	91	84.8	1				1878	36	78.95	11849	22	66.34	11862	27	57.10		I That I	P 15 18 18 2
ndex 2 11878	36	124.06	11917	56	89.21	11803	3	77.7	5			1	× 2 1918	57	129.02	11878	36	107.66	11907	52	73.53			
idex 3 11897	44	185.76	11893	43	179.02	11933	61	171.1	8				× 3 1819	15	79.54	11984	50	48.73	11881	39	48.43			
ndex 4 11933	61	344.08	11890	41	207.78	11900	46	197.1	9				× 4 1879	37	71.05	11907	52	61.52	11984	92	57.98			
ndex 5 11800	1	386.72	11933	61	250.01	11874	34	191.8					x 5 1962	81	99.42	11963	82	71.91	11826	17	68.65			
ndex 6 11878	36	283.05	11881	39	236.77	11907	52	236.6	8				x 6 1800	1	110.76	11907	52	96.56	11812	9	64,66			
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ndex 9 11933	61	517.08	11901	52	347.86		M1982:	0.02/ 1	1983: -6	.02/ M19	9: -0.10	M1998	-0.21/	M1991:	0.01/			Ê	Aial	+ 8	• A* A* Aa • 🐐	E - E - To - E E I I I		
ndex 10 11878	36	220.18	11907	61	187.50	111	M2001:	0.05/ 1	2002: 0	.07/ 20	34: -0.03	2885:	0.09/	2006:	-8.85/							■=== 1= 1Nudpk1		
ndex 11							1801:														Debrecká, M.C	utruba, Velický, M.Lukáč		
11878 ndex 12	36	280.98	11882	40	178.87	115				.02/ 19 .02/ 20				1984:	-0.03/			×	(l. 1994 po	zorovali	Debrecká, M.	Dtruba, Velický Otruba, Gubric		
11878 ndex 13	36	160.46	11856	25	119.35		1803:											1	. 1995 poz	orovali I	Debrecká, Gub	ric		
11933 ndex 14	61	702.89	11878	36	386.41					.01/ 19 .03/ M20				M1999:	-0.077						Debrecká, Gu Debrecká, Gut			
11933 ndex 15		1141.01	11820	16	302.99		L1804:	.0 03/ 1	1971	.04/ M19	73- 0.04	H1974	0 14/	M1975	-0.067						Debrecká, Gu M.Otruba, Ve			
11933 ndex 16		1463.97	11879	37	378.85	119	M1979:	-0.05/ 1	1981: -6	.02/ M19	84: -0.13	M1985:	-8.84/	1989:	-8.82/			V	/III. 1995 E	Debrecká	, Velický, M. H	lorňák		
11933 ndex 17	61	285.16	11820	16	223.96		M2002:	0.01/ 1														ký, Horňák, nadm. výška terénu por 088. maxim. č. 531. minim. č. 3111.		
11933	61	2006.22	11820	16	621.32	119				.05/ M19									d III. 1996 /II. 1996 pr			Velický, vymenený maxim. teplomer		
							M2001: 2014:		2002: 0	.02/ M20	93: 0.23	M2805:	0.07/	M2007:	0.05/			×	(l. 1996 po	zorovali	Debrecká, Ve			
							1971-	0.02/	1997- 4	.27/ 19	130 26	1995	0.027	M2897-	-8.317			- I.	1997 poz	orovali D)ebrecká, Velic			
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							1810:											×	(. 1997 vyr	nenený	príz. minim. č.	4116 za č. 0650 neteorologickej búdke; suchý č. 177.		
								0.01/ 1	1993: 6	.01/ M19	94: 0.07	M1995:	0.07/	M2009:	0.03			p	ríz. minim	č. 3379	· '			
										.01/ M19												er č. 4081 za č. 3411 er č. 3411 za č. 4081		
							2000: M2008:	0.05/	2002: 0 12009: -0	.04/ 20 .01/ M20	05: -0.03 10: 0.11	M2805	0.11/	M2007: M2012:	0.19/ -0.08			- iv	V. 1999 vy	menený	minim. teplom	er č. 4081 za č. 3411		
							1973-	.0 03/	1976 - 4	.04/ 19	78- 0.16	1979	-0.15/	2034	-0.017			p	riz. minim.	č. 2716		neteorologickej búdke: suchý č. 305,		
										.02/ 20											/elický, Likavča Debrecká Veli	an cký, Likavčan a vymenený maxim. t	enlomer č. 6113 za č. 5636.	
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							M1997:	0.03/ 1	1998: 6	.02/ M20	s4: 0.06	M2809	-0.03/	2010:	0.03					menen		er č. 9887 za č. 4182		
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Interpolated data

Conclusion:

- The results presented in the paper show changes in the design values of the frost index for periodicity n = 0.10; n = 0.15 and n = 0.25 and changes in average annual air temperature for the period 1968 – 2017 in Slovakia.

- We used 93 meteorological stations for homogenization.
- Most inhomogeneties were caused by relocating the station or changing the observer, or replacing the instrument.

- We calculated the frost index using the Pearson coefficient.

- The maps of average date temperature and frost index, were interpolate with 3D method in GIS Grass.

-The resulting maps form the basis for updating the norm and are intended to adapt to the new climatic conditions for the design of roads and traffic areas burdened by non-rail traffic and climatic effects.

-all temperature regions have shifted slightly to the north

Thank you for your attention