

Mendelova zemědělská a lesnická univerzita v Brně
Fakulta lesnická a dřevařská



Mapová algebra v IDRISI Kilimanjaro

Potenciální průměrné roční teploty vzduchu
ŠLP Křtiny

Ing. Martin Klimánek
Ústav geoinformačních technologií

Průměrná roční teplota vzduchu

1. Tuřany	241 m n.m.	8,9 °C
2. Pisárky	223 m n.m.	8,5 °C
3. Babice	460 m n.m.	6,6 °C
4. Bukovinka	524 m n.m.	6,4 °C
5. Blansko	287 m n.m.	8,4 °C
6. Kuřim	291 m n.m.	8,0 °C
7. Olomučany	360 m n.m.	7,6 °C
8. Hády	420 m n.m.	7,5 °C
9. Soběšice	398 m n.m.	7,2 °C
10. Vranov	440 m n.m.	6,9 °C
11. Polanka	296 m n.m.	8,2 °C
12. Křtiny	430 m n.m.	7,1 °C
13. Proklest	540 m n.m.	6,1 °C

$$T = T1 + T2 [^{\circ}\text{C}]$$

T1... závislost teploty na nadmořské výšce
T2... oprava teploty na sklon a expozici terénu

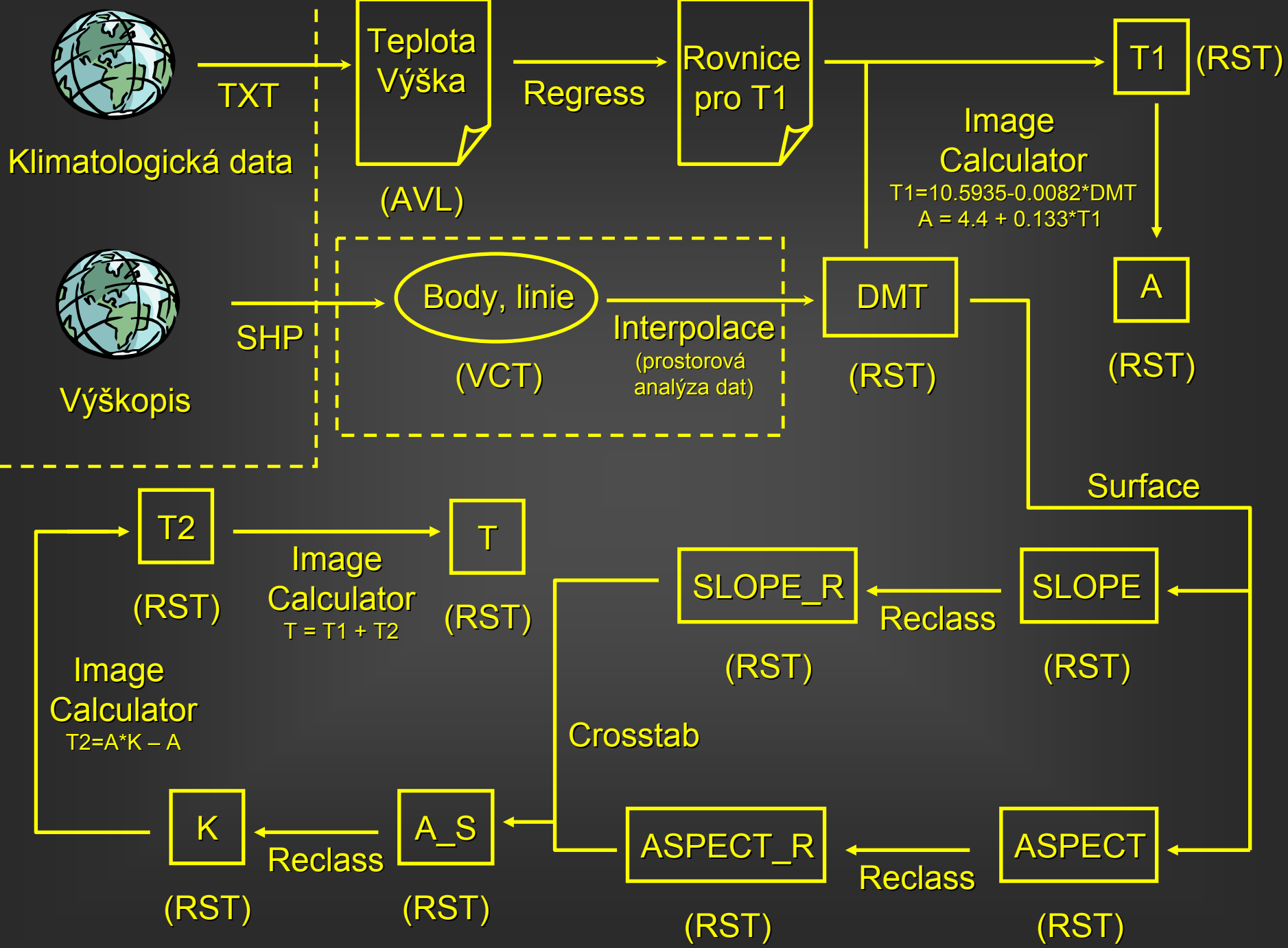
$$T1 = 10.5935 - 0.0082 * [\text{DMT}]$$

$$T2 = A.K - A$$

$$A = 4.4 + T1 * 0.133$$

K = koeficient relativní ozáření

„K“	(1) 0°-5°	(2) 5°-10°	(3) 10°-15°	(4) 15°-20°	(5) 20°-25°	(6) 25°-30°	(7) 30°-40°	(8) 40°-50°
(1) J	1.05 (02)	1.11 (07)	1.17 (12)	1.22 (17)	1.26 (22)	1.31 (27)	1.34 (32)	1.37 (37)
(2) JV, JZ	1.04 (03)	1.10 (08)	1.16 (13)	1.20 (18)	1.24 (23)	1.26 (28)	1.28 (33)	1.30 (38)
(3) V, Z	1.02 (04)	1.06 (09)	1.09 (14)	1.11 (19)	1.12 (24)	1.12 (29)	1.10 (34)	1.07 (39)
(4) SV, SZ	1.00 (05)	1.02 (10)	1.01 (15)	1.00 (20)	0.99 (25)	0.97 (30)	0.92 (35)	0.84 (40)
(5) S	0.99 (06)	1.00 (11)	0.98 (16)	0.96 (21)	0.93 (26)	0.87 (31)	0.81 (36)	0.75 (41)





REGRESS

IDRISI The Kilimanjaro Edition

File Display GIS Analysis Modeling Image Processing Reformat Data Entry Window List Help

REGRESS - regression analysis

File type:
 Image files Attribute values files

Independent variable: vyska
Dependent variable: teplota

OK Close Help

Regress

$Y = 10.593491 + -0.008211 X$ $r = -0.975923$

Regression Parameters:

X axis: vyska
Y axis: teplota

Coeff. of Det.	=	95.24 %
Std. Dev. of X	=	103.556253
Std. Dev. of Y	=	0.871265
S.E. of Estimate	=	0.190037
Std. Error of Beta	=	0.000553
t Stat for r or Beta	=	-14.839653
t Stat for Beta <> 1	=	-1822.157056
Sample Size (n)	=	13
Apparent df	=	11

Show Regression Line

Save to Clipboard Close
Print Help

low frequency high frequency



IMAGE CALCULATOR

$$T1 = 10.5935 - (0.0082 * [DMT])$$
$$A = 4.4 + (0.133 * [T1])$$

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File Display GIS Analysis Modeling Image Processing Reformat Data Entry Window List Help

dmT

Image Calculator - Map Algebra and Logic Modeler

Operation type : Mathematical expression Logical expression

Output file name : = Expression to process :

7 8 9 / ^X COVER
4 5 6 * NRATIO NEG
1 2 3 - MIN RECIP
0 . - + MAX LN
() [] Insert Image

Process Expression Save Expression Open Ex

Image Calculator - Map Algebra and Logic Modeler

Operation type : Mathematical expression Logical expression

Output file name : = Expression to process :

7 8 9 / ^X COVER EXP SIN ARCCOS
4 5 6 * NRATIO NEG LOGIT COS ARCTAN
1 2 3 - MIN RECIP SQRT TAN RAD
0 . - + MAX LN SQR ARCSIN DEG
() [] Insert Image CLEAR ABS

Process Expression Save Expression Open Expression Close Help

<200.29
223.64
246.99
270.34
293.68
317.03
340.38
363.73
387.08
410.43
433.78
457.12
480.47
503.82
527.17
550.52
573.87



SURFACE

IDRISI The Kilimanjaro Edition

File Display GIS Analysis Modeling Image Processing Reformat Data Entry Window List Help

GPS

dmtdmt

SURFACE - surface analysis

Calculate:

- Slope
- Slope and aspect
- Aspect
- Analytical hillshading

Input elevation model:

Output slope image:

Output aspect image:

Calculate slopes in:

- degrees
- percent

Conversion from unspecified to m:

Slope image title:

Aspect image title:

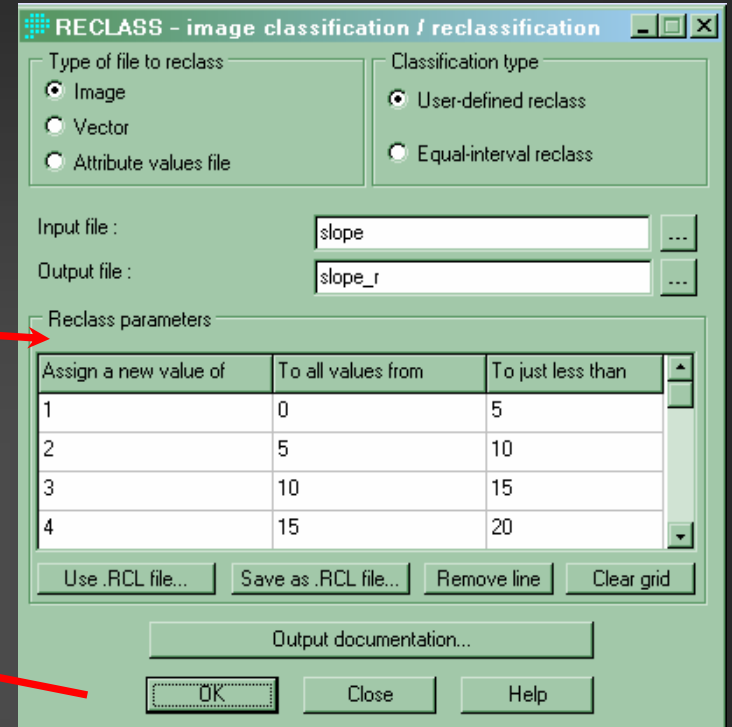
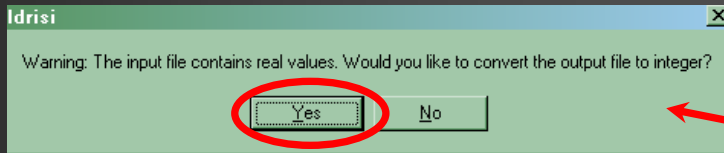
OK Close Help

<200.29
223.64
246.99
270.34
293.68
317.03
340.38
363.73
387.08
410.43
433.78
457.12
480.47
503.82
527.17
550.52
573.87



RECLASS

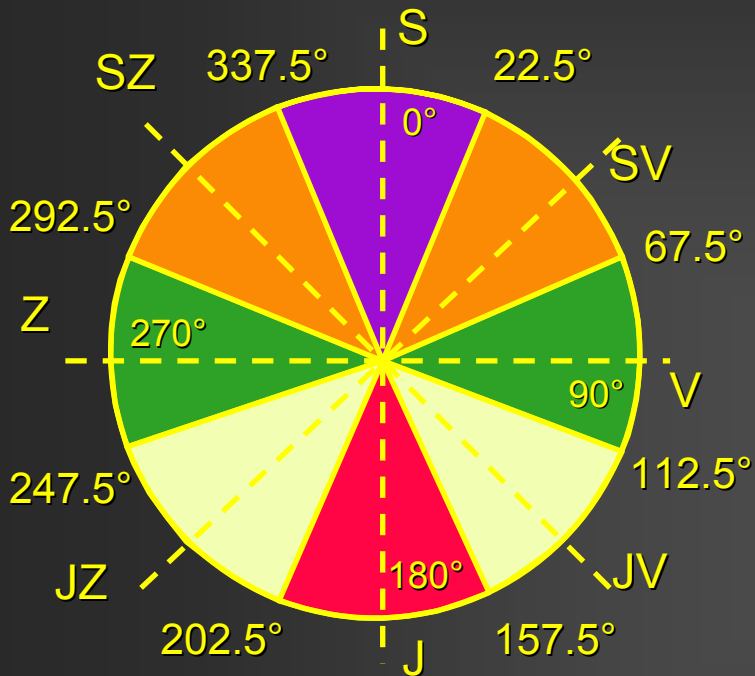
1 0 5
 2 5 10
 3 10 15
 4 15 20
 5 20 25
 6 25 30
 7 30 40
 8 40 50



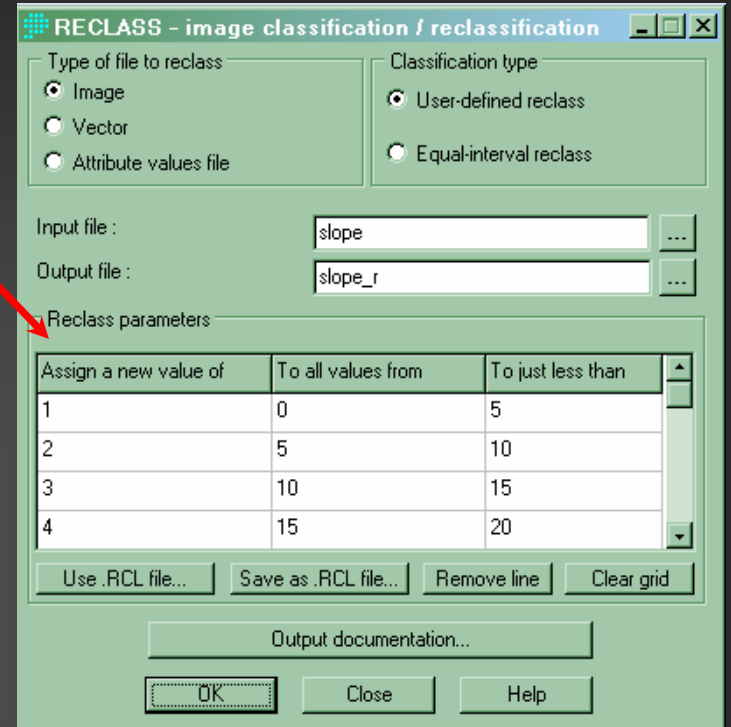
„k“	(1) 0°-5°	(2) 5°-10°	(3) 10°-15°	(4) 15°-20°	(5) 20°-25°	(6) 25°-30°	(7) 30°-40°	(8) 40°-50°
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(5) S	0.99 (06)	1.00 (11)	0.98 (16)	0.96 (21)	0.93 (26)	0.87 (31)	0.81 (36)	0.75 (41)



RECLASS



1	157.5	202.5
2	112.5	157.5
2	202.5	247.5
3	67.5	112.5
3	247.5	292.5
4	22.5	67.5
4	292.5	337.5
5	0	22.5
5	337.5	360
0	-1	0



„k“	(1) 0°- 5°	(2) 5°-10°	(3) 10°-15°	(4) 15°-20°	(5) 20°-25°	(6) 25°-30°	(7) 30°-40°	(8) 40°-50°
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CROSSTAB

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File Display GIS Analysis Modeling Image Processing Reformat Data Entry Window List Help

aspect_r

slope_r

CROSSTAB - cross-tabulation

First image: aspect_r

Second image: slope_r

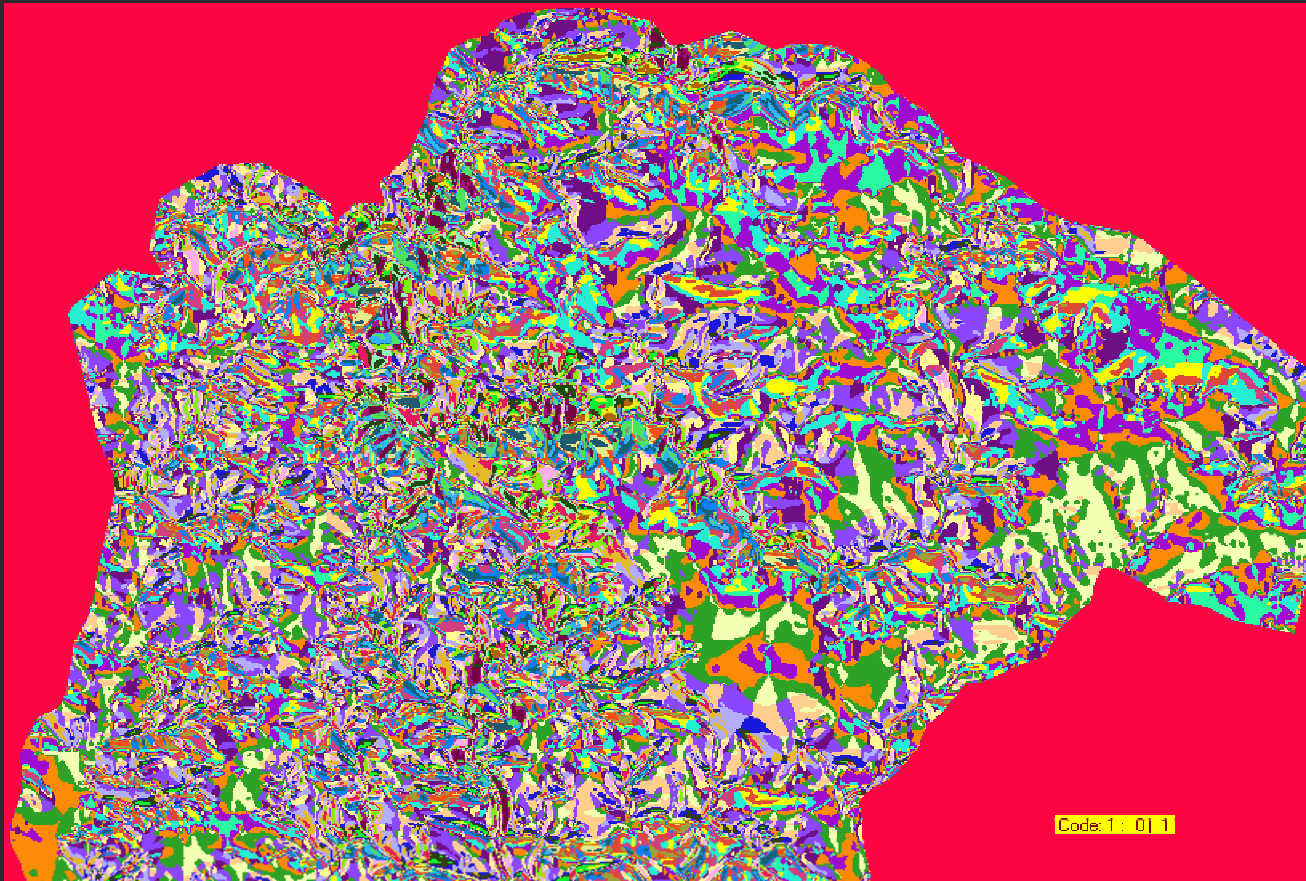
Output type:

- Cross-classification image
- Full cross-tabulation table
- Both cross-classification and tabulation
- Image similarity / association data only

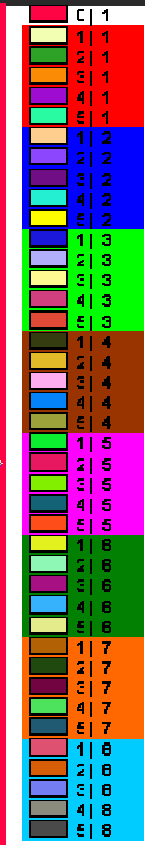
Output image: A_S

OK Close Help

1
2
3
4
5
6
7
8



expoziční | sklon



Křížová klasifikace reklasifikovaných expozičních a sklonů svahů pro koeficient „K“

„K“	(1) 0°-5°	(2) 5°-10°	(3) 10°-15°	(4) 15°-20°	(5) 20°-25°	(6) 25°-30°	(7) 30°-40°	(8) 40°-50°
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(4) SV, SZ	1.00 (05)	1.02 (10)	1.01 (15)	1.00 (20)	0.99 (25)	0.97 (30)	0.92 (35)	0.84 (40)
(5) S	0.99 (06)	1.00 (11)	0.98 (16)	0.96 (21)	0.93 (26)	0.87 (31)	0.81 (36)	0.75 (41)



RECLASS

0 0 2	1.17 12 13	1.24 23 24	1.10 34 35
1.05 2 3	1.16 13 14	1.12 24 25	0.92 35 36
1.04 3 4	1.09 14 15	0.99 25 26	0.81 36 37
1.02 4 5	1.01 15 16	0.93 26 27	1.37 37 38
1.00 5 6	0.98 16 17	1.31 27 28	1.30 38 39
0.99 6 7	1.22 17 18	1.26 28 29	1.07 39 40
1.11 7 8	1.20 18 19	1.12 29 30	0.84 40 41
1.10 8 9	1.11 19 20	0.97 30 31	0.75 41 42
1.06 9 10	1.00 20 21	0.87 31 32	
1.02 10 11	0.96 21 22	1.34 32 33	
1.00 11 12	1.26 22 23	1.28 33 34	

RECLASS - image classification / reclassification

Type of file to reclass: Image Vector Attribute values file

Classification type: User-defined reclass Equal-interval reclass

Input file: ...

Output file: ...

Reclass parameters:

Assign a new value of	To all values from	To just less than
0	0	2
1.05	2	3
1.04	3	4
1.02	4	5

Use .RCL file... Save as .RCL file... Remove line Clear grid

Output documentation...

OK Close Help

„k“	(1) 0°-5°	(2) 5°-10°	(3) 10°-15°	(4) 15°-20°	(5) 20°-25°	(6) 25°-30°	(7) 30°-40°	(8) 40°-50°
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(4) SV, SZ	1.00 (05)	1.02 (10)	1.01 (15)	1.00 (20)	0.99 (25)	0.97 (30)	0.92 (35)	0.84 (40)
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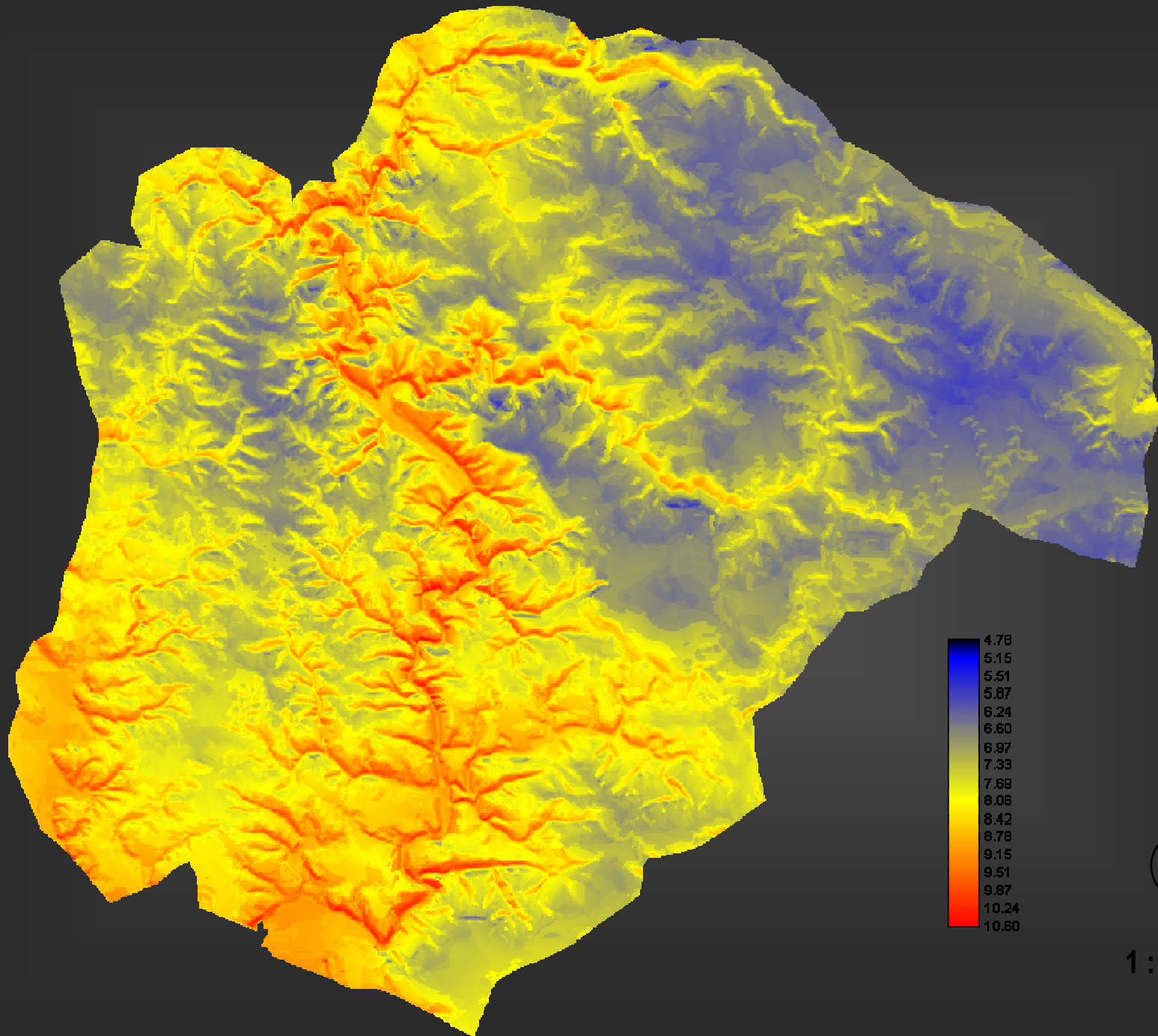


IMAGE CALCULATOR

$$T2=(A*K)-A$$
$$T=T1+T2$$

The screenshot shows the IDRISI software interface with the following elements:

- Top Bar:** IDRISI The Kilimanjaro Edition. Menu items: File, Display, GIS Analysis, Modeling, Image Processing, Reformat, Data Entry, Window List, Help.
- Toolbar:** Contains various icons for file operations, processing, and navigation. One icon (a grid) is circled in red.
- Main Window:** Titled 'k'. Header: **Cross-Classification : aspect_r | slope_r**. The background is a terrain map with a color scale on the right ranging from 0.00 to 0.37.
- Image Calculator - Map Algebra and Logic Modeler (Left Dialog):**
 - Operation type: Mathematical expression, Logical expression
 - Output file name: **t2**
 - Expression to process: **[[a]*[k]-[a]]**
 - Buttons: Process Expression, Save Expression
- Image Calculator - Map Algebra and Logic Modeler (Right Dialog):**
 - Operation type: Mathematical expression, Logical expression
 - Output file name: **t**
 - Expression to process: **[[t1]+[t2]]**
 - Buttons: Process Expression, Save Expression, Open Expression, Close, Help



S
↑
1 : 75 000



MACRO MODELLER

