

FUZZY BASED LANDFORM CLASSIFICATION

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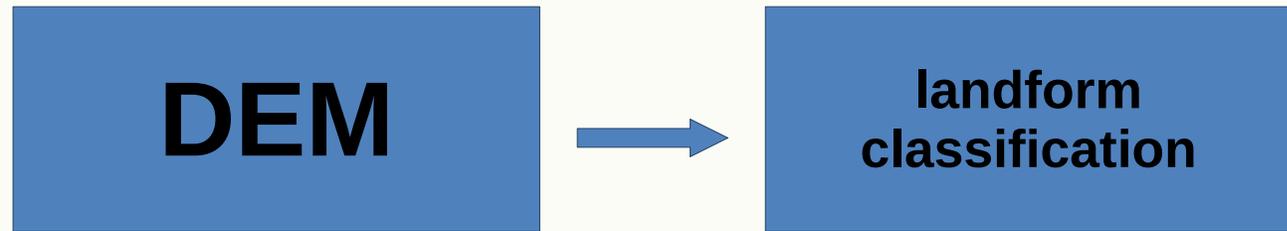
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The landform elements and the landform classification

- Plane
- Slope
- Ridge
- Valley
- Peak
- Pit
- Saddle

(may be other classification)



The fuzzy logic and fuzzy sets

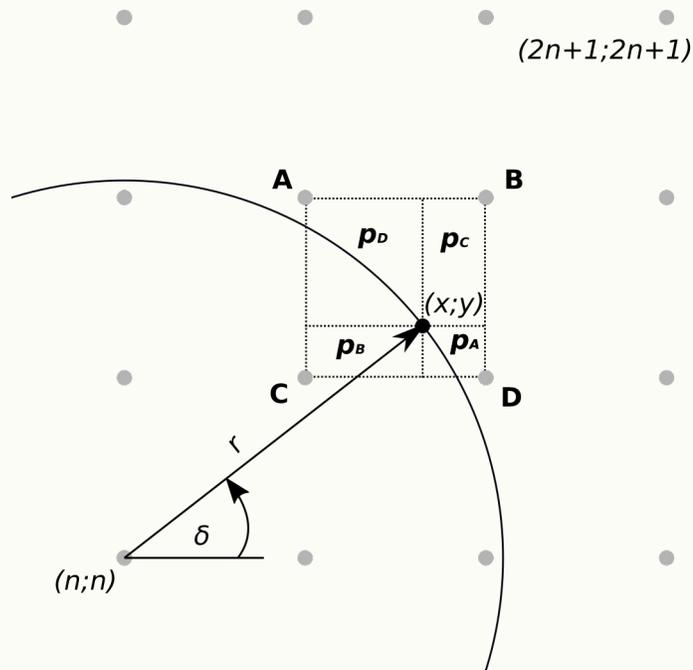
- Classical logic: $\{0;1\}$
- Fuzzy logic: $[0;1]$
- These values may be the value of a membership function of a classical/fuzzy set



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Principles



A0						
0.000	0.001	0.018	0.030	0.018	0.001	0.000
0.001	0.042	0.052	0.035	0.052	0.042	0.001
0.018	0.052	0.002	0.000	0.002	0.052	0.018
0.030	0.035	0.000	-0.001	0.000	0.035	0.030
0.018	0.052	0.002	0.000	0.002	0.052	0.018
0.001	0.042	0.052	0.035	0.052	0.042	0.001
0.000	0.001	0.018	0.030	0.018	0.001	0.000

A1						
0.000	-0.001	-0.006	-0.000	0.006	0.001	0.000
-0.001	-0.029	-0.023	0.000	0.023	0.029	0.001
-0.017	-0.046	-0.001	0.000	0.001	0.046	0.017
-0.030	-0.034	0.000	0.000	0.000	0.034	0.030
-0.017	-0.046	-0.001	0.000	0.001	0.046	0.017
-0.001	-0.029	-0.023	0.000	0.023	0.029	0.001
0.000	-0.001	-0.006	-0.000	0.006	0.001	0.000

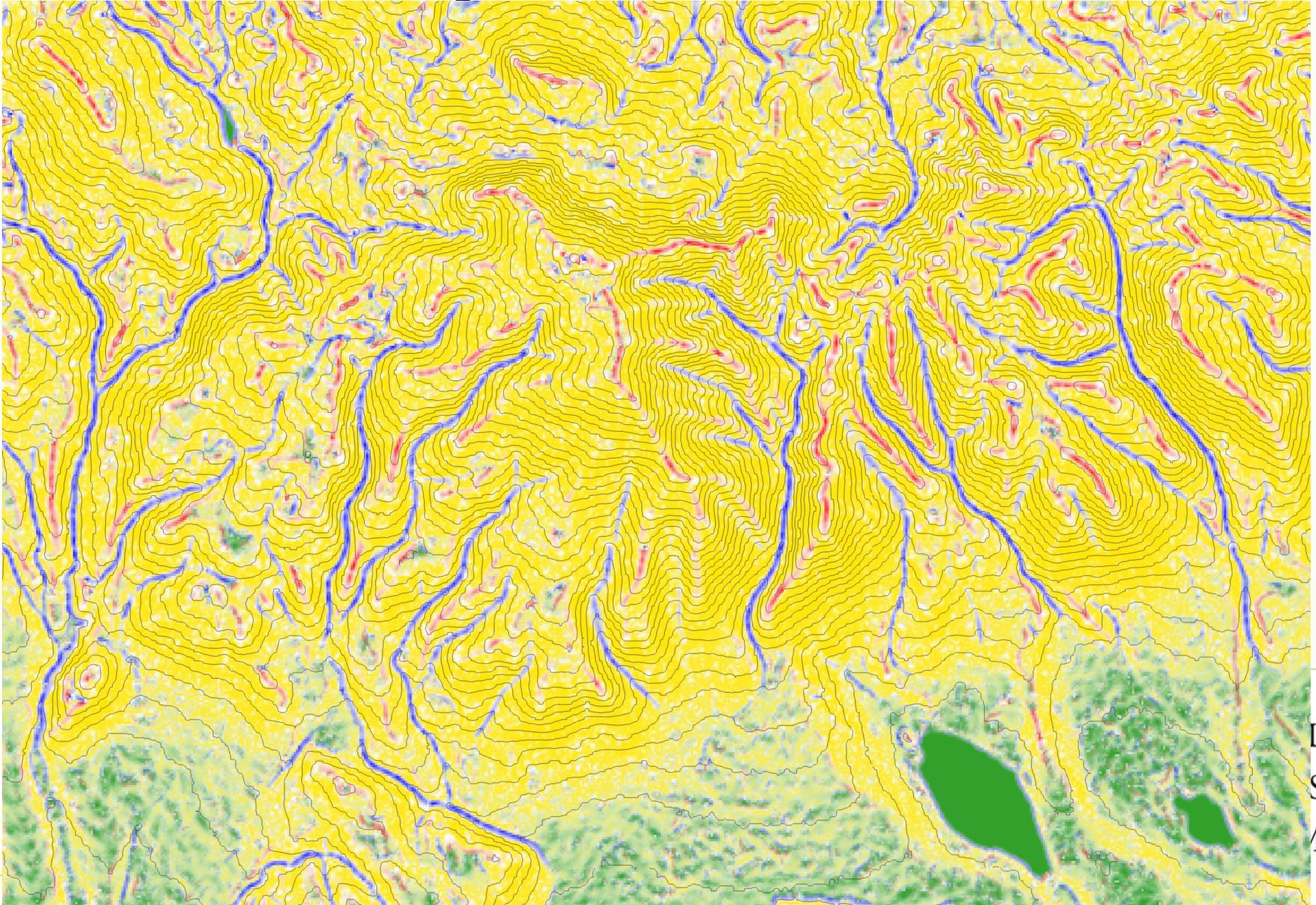
A2						
0.000	-0.000	-0.014	-0.029	-0.014	-0.000	0.000
0.000	-0.000	-0.029	-0.032	-0.029	0.000	0.000
0.014	0.029	0.000	0.000	0.000	0.029	0.014
0.029	0.032	0.000	0.000	0.000	0.032	0.029
0.014	0.029	-0.000	0.000	-0.000	0.029	0.014
0.000	0.000	-0.029	-0.032	-0.029	-0.000	0.000
0.000	-0.000	-0.014	-0.029	-0.014	-0.000	0.000

B1						
0.000	-0.001	-0.017	-0.030	-0.017	-0.001	0.000
-0.001	-0.029	-0.046	-0.034	-0.046	-0.029	-0.001
-0.006	-0.023	-0.001	0.000	-0.001	-0.023	-0.006
0.000	-0.000	0.000	-0.000	0.000	0.000	0.000
0.006	0.023	0.001	0.000	0.001	0.023	0.006
0.001	0.029	0.046	0.034	0.046	0.029	0.001
0.000	0.001	0.017	0.030	0.017	0.001	0.000

B2						
0.000	0.001	0.010	0.000	-0.010	-0.001	0.000
0.001	0.040	0.039	-0.000	-0.039	-0.040	-0.001
0.010	0.039	0.002	0.000	-0.002	-0.039	-0.010
-0.000	0.000	0.000	0.000	0.000	-0.000	-0.000
-0.010	-0.039	-0.002	0.000	0.002	0.039	0.010
-0.001	-0.040	-0.039	-0.000	0.039	0.040	0.001
0.000	-0.001	-0.010	0.000	0.010	0.001	0.000

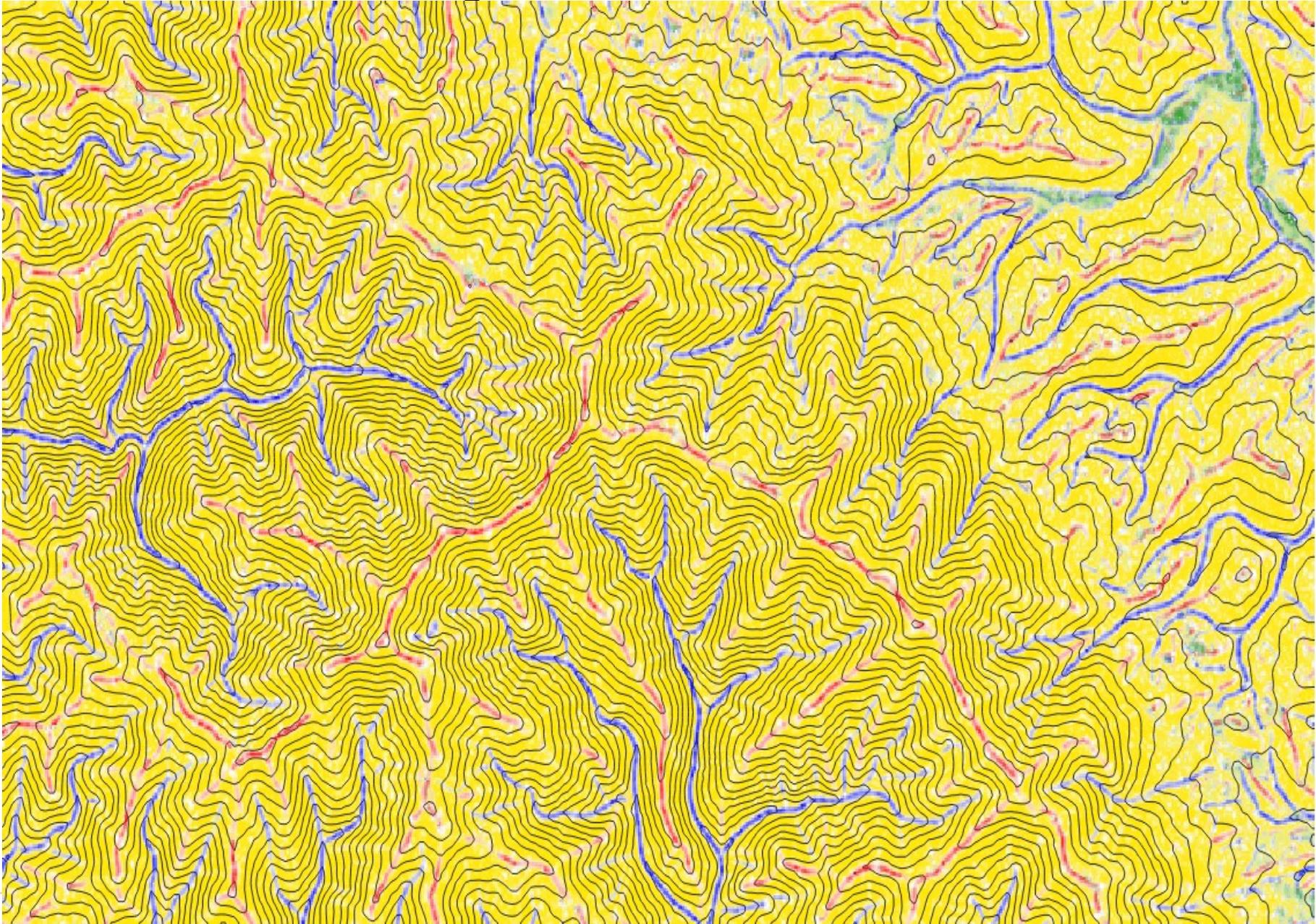
Calculate fuzzy values from the r distance Fourier coefficients (a_0 , a_1 , b_1 , a_2 , b_2) and an e parameter.

Fuzzy classification



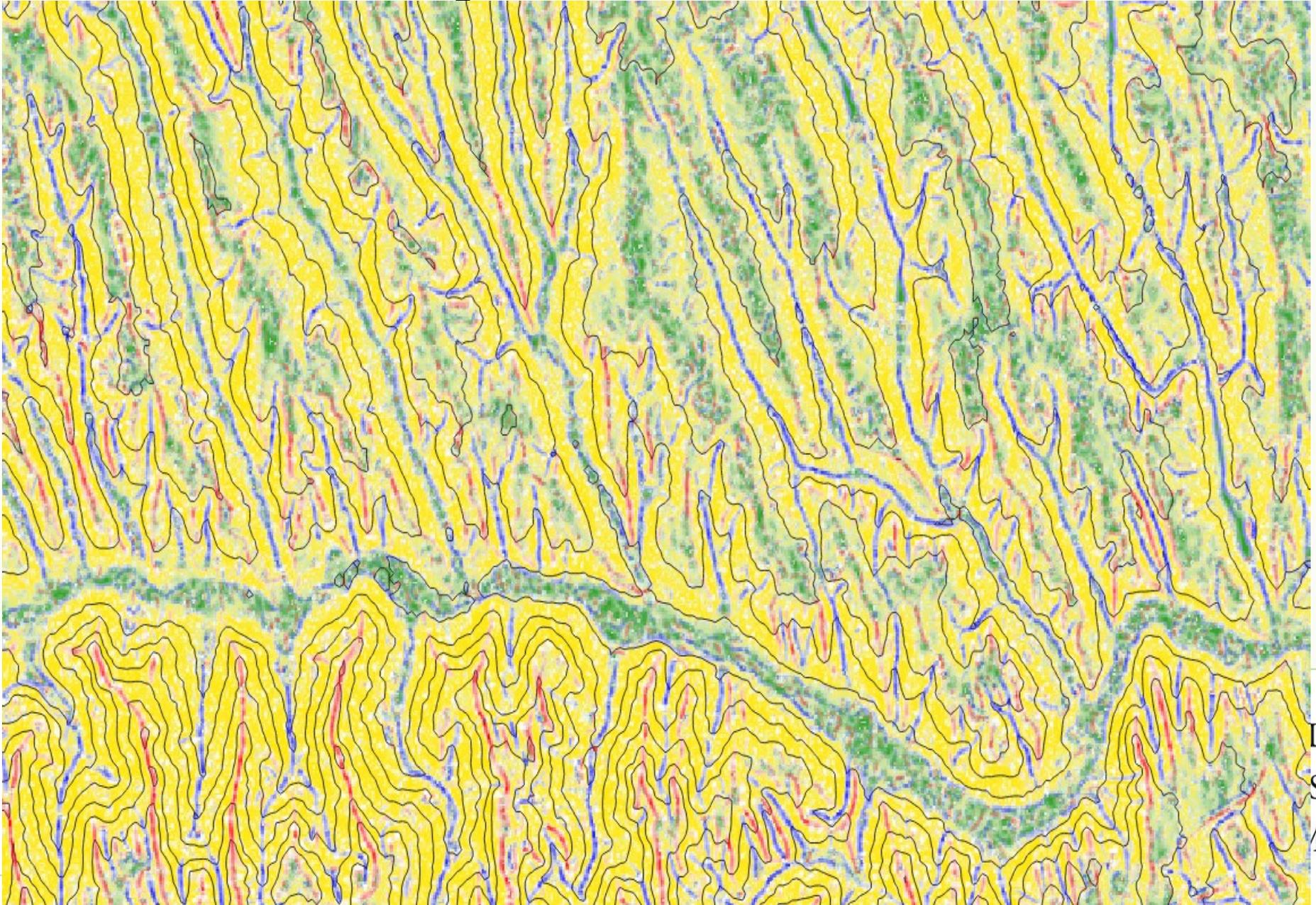
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SULÓ
1

Fuzzy classification



LAPBÓL
SULÓ
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Fuzzy classification



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Application areas

- Fuzzy analyses
 - any analysis where the landform is important
- Defuzzification
 - create a normal classification, use in classical logical expressions

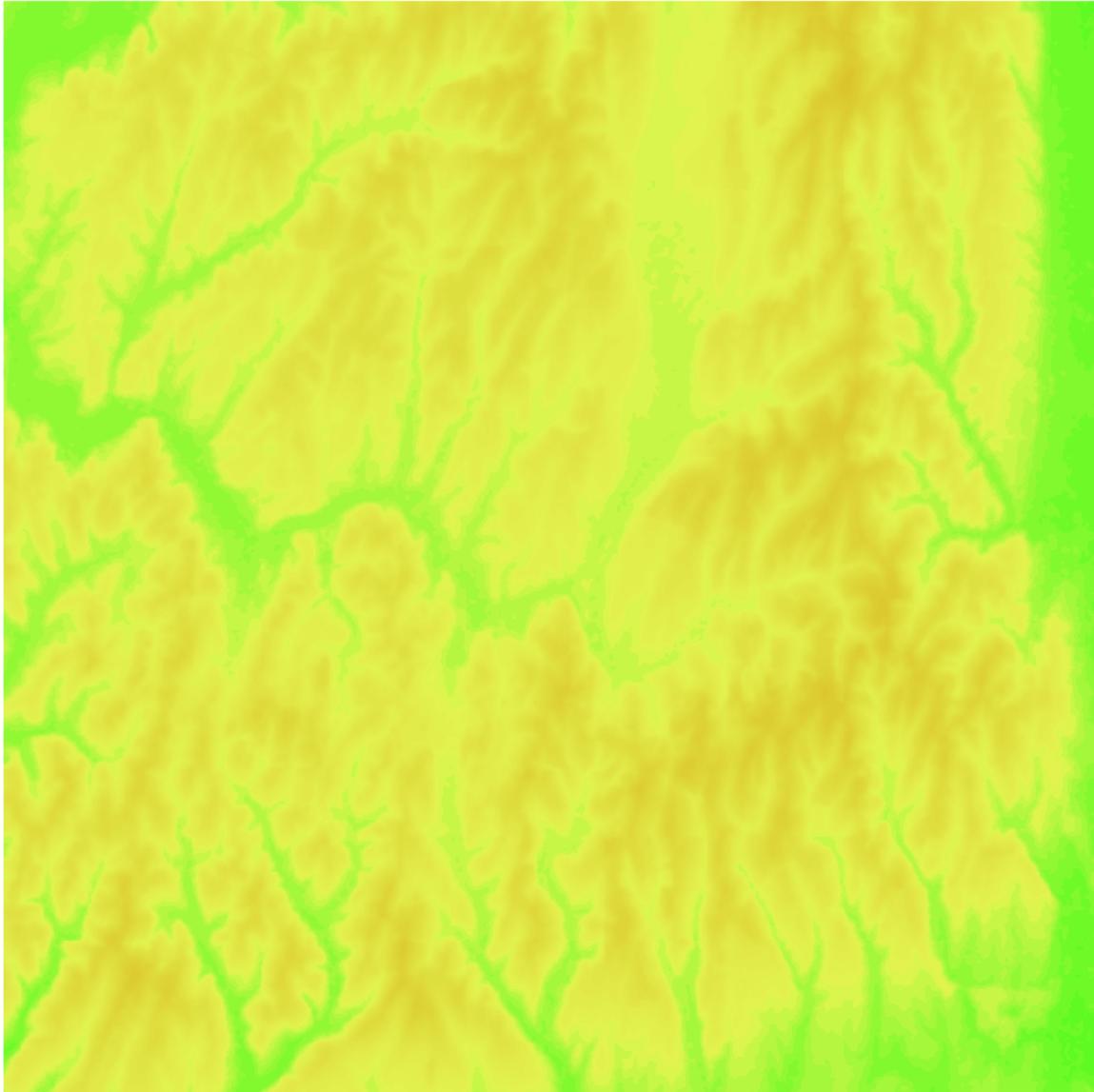


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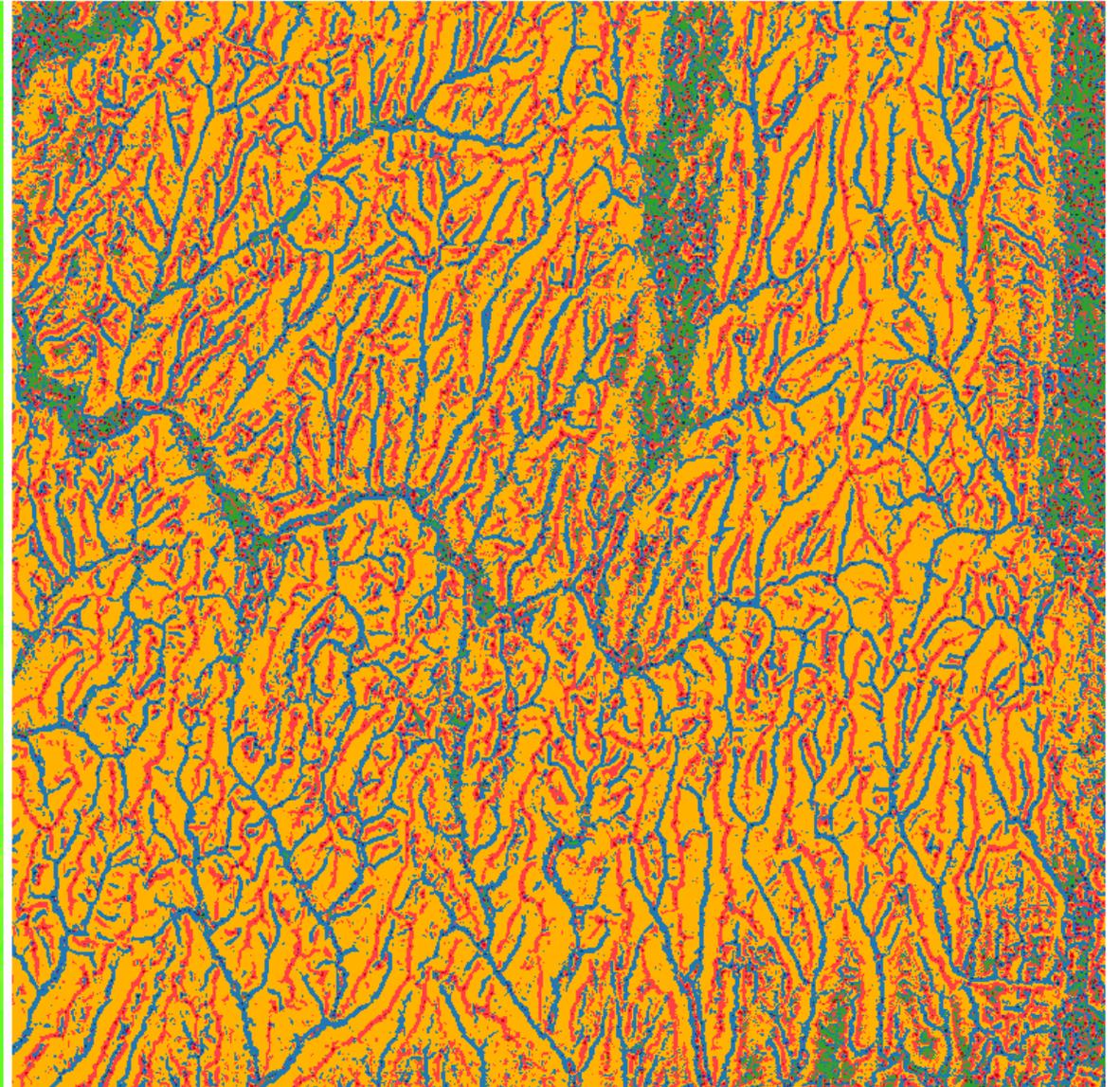
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Defuzzification

ELEV

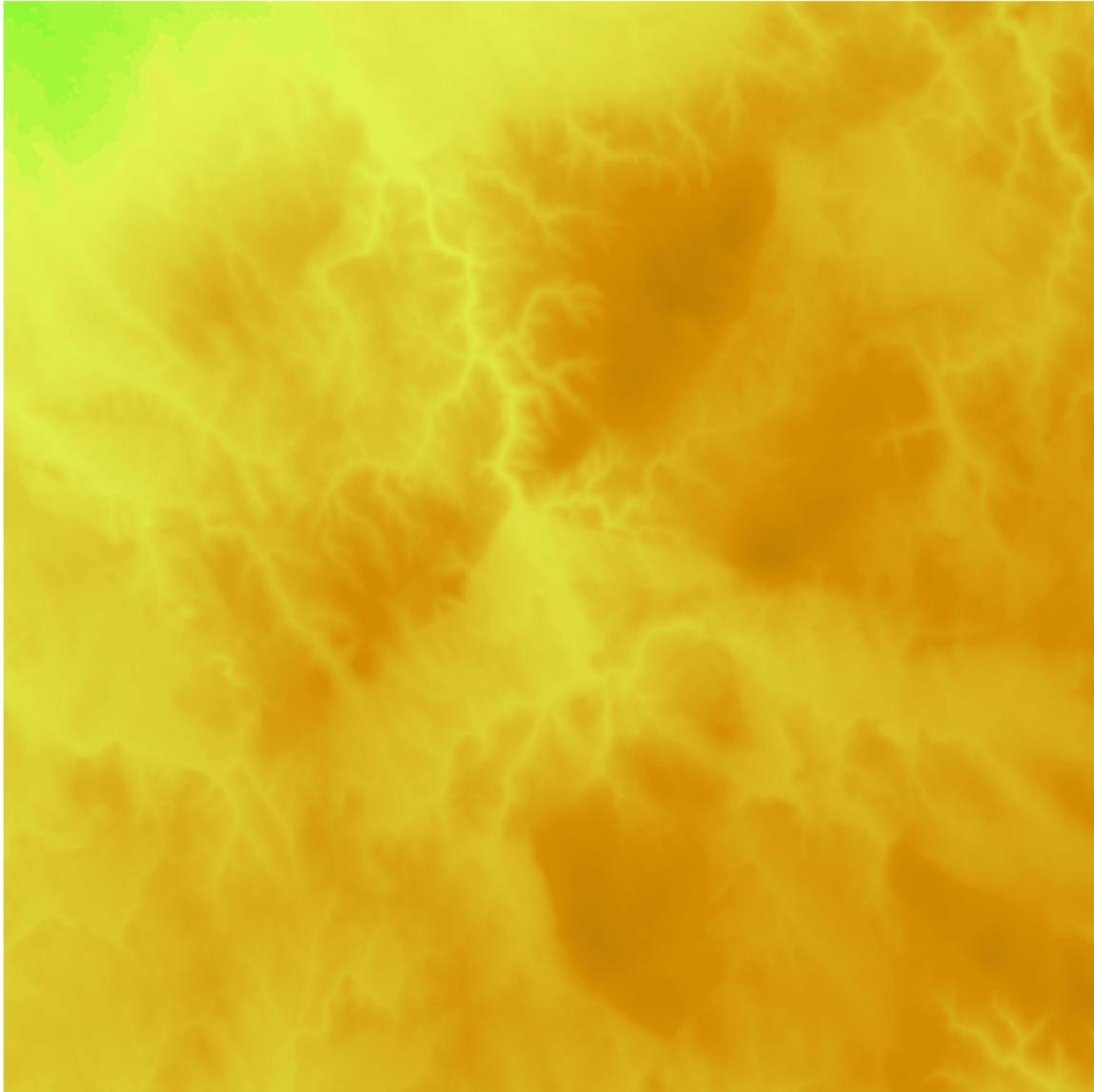


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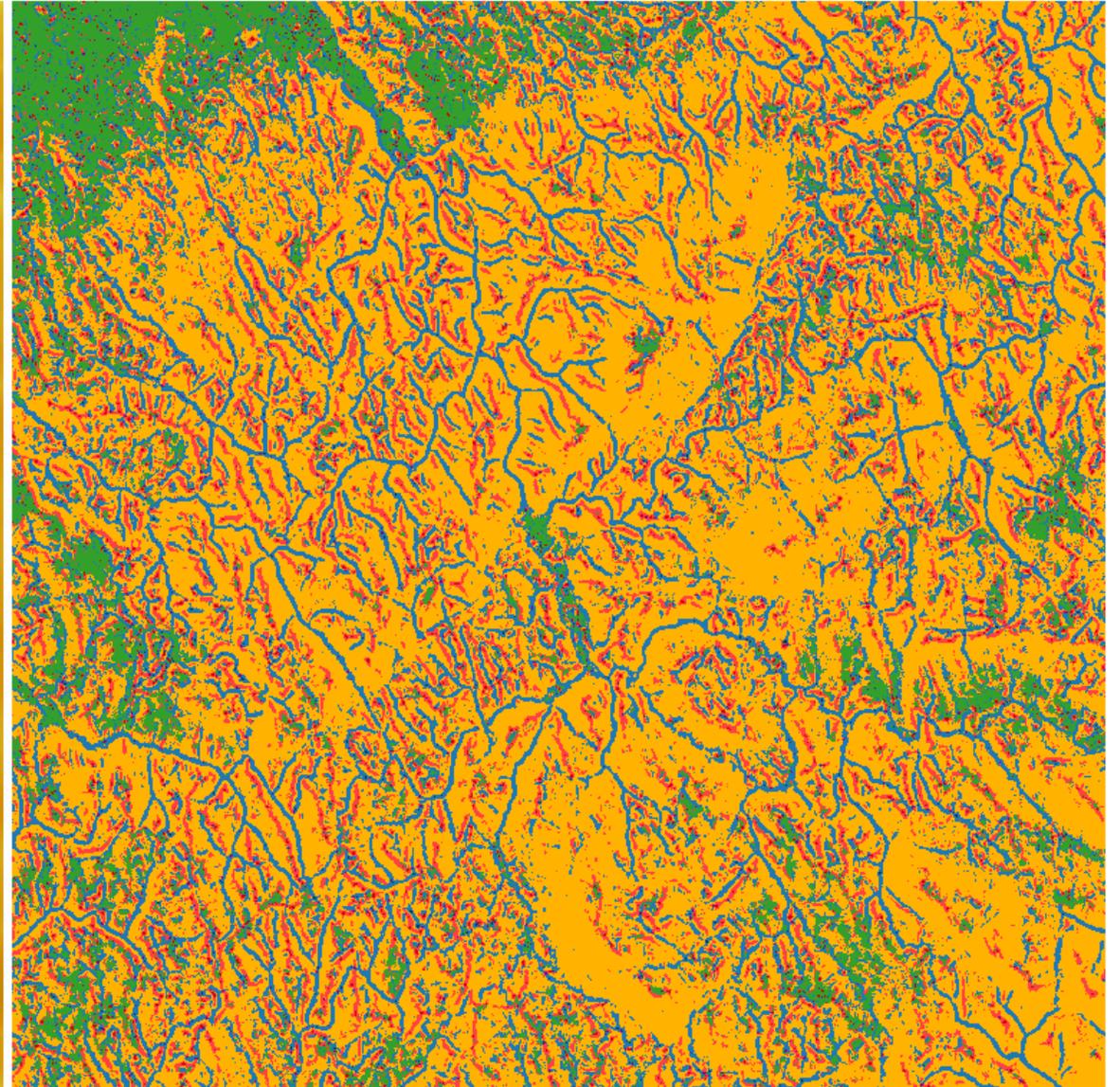


Defuzzification

ELEV

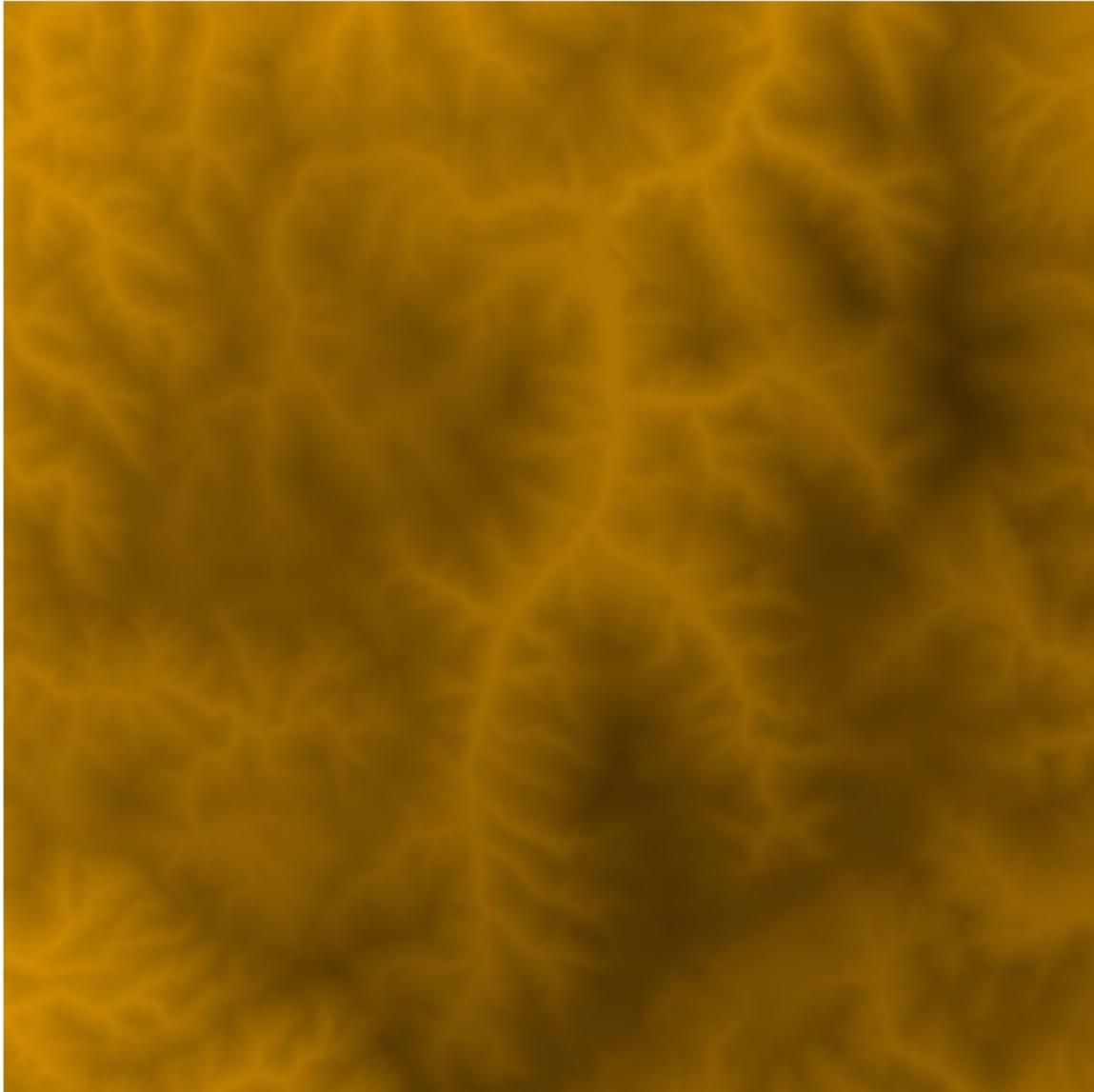


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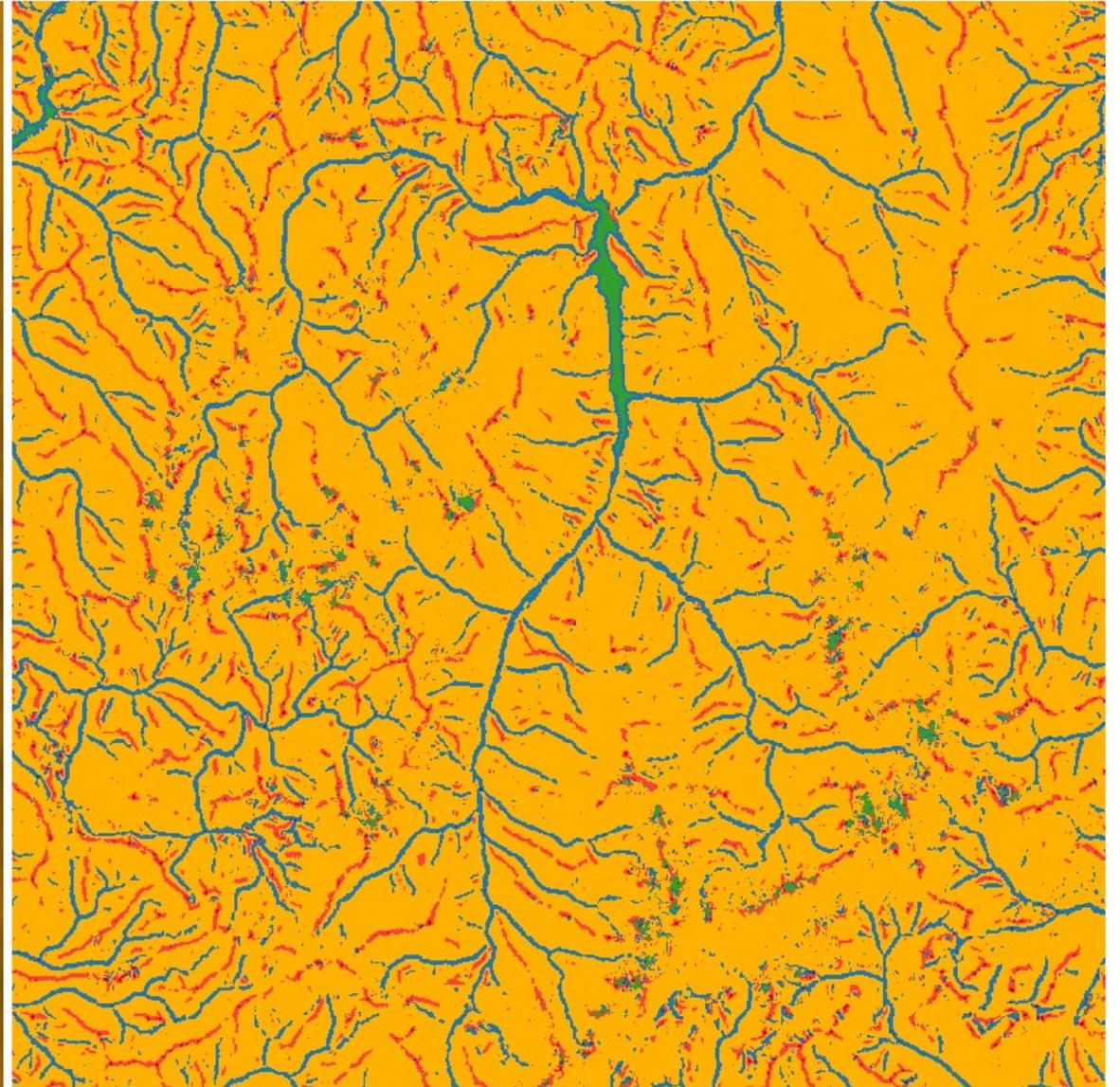


Defuzzyfication

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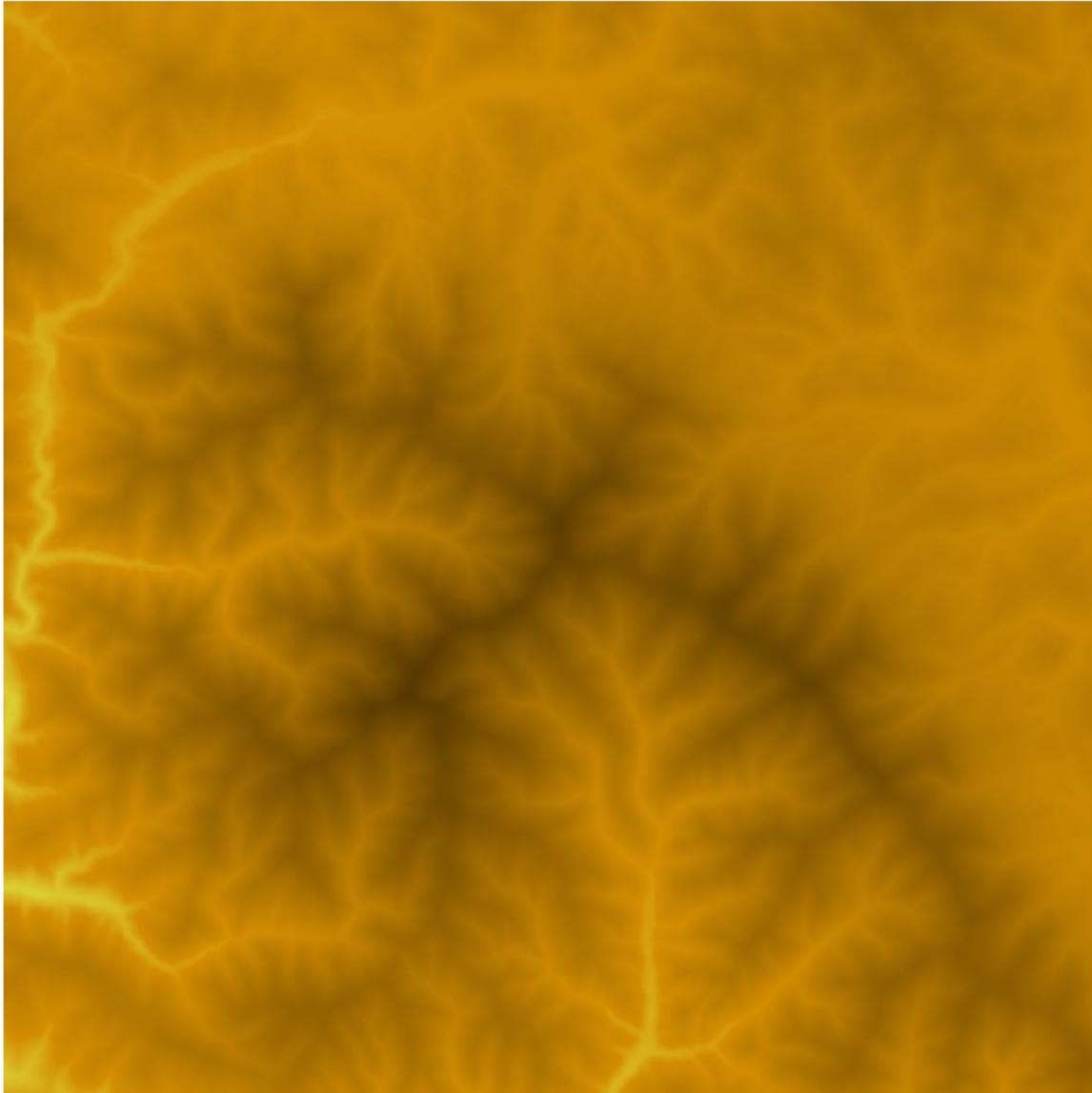


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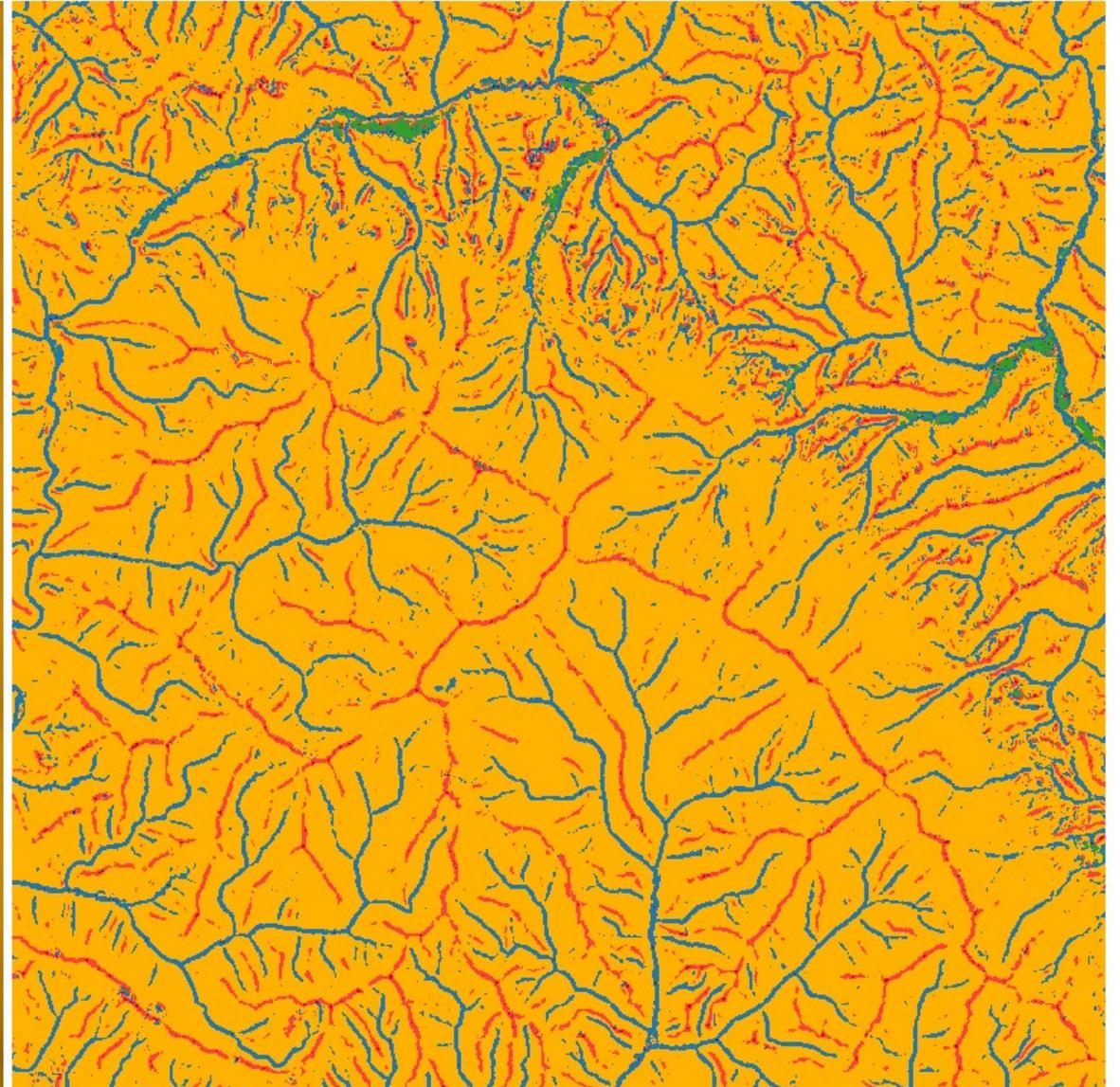


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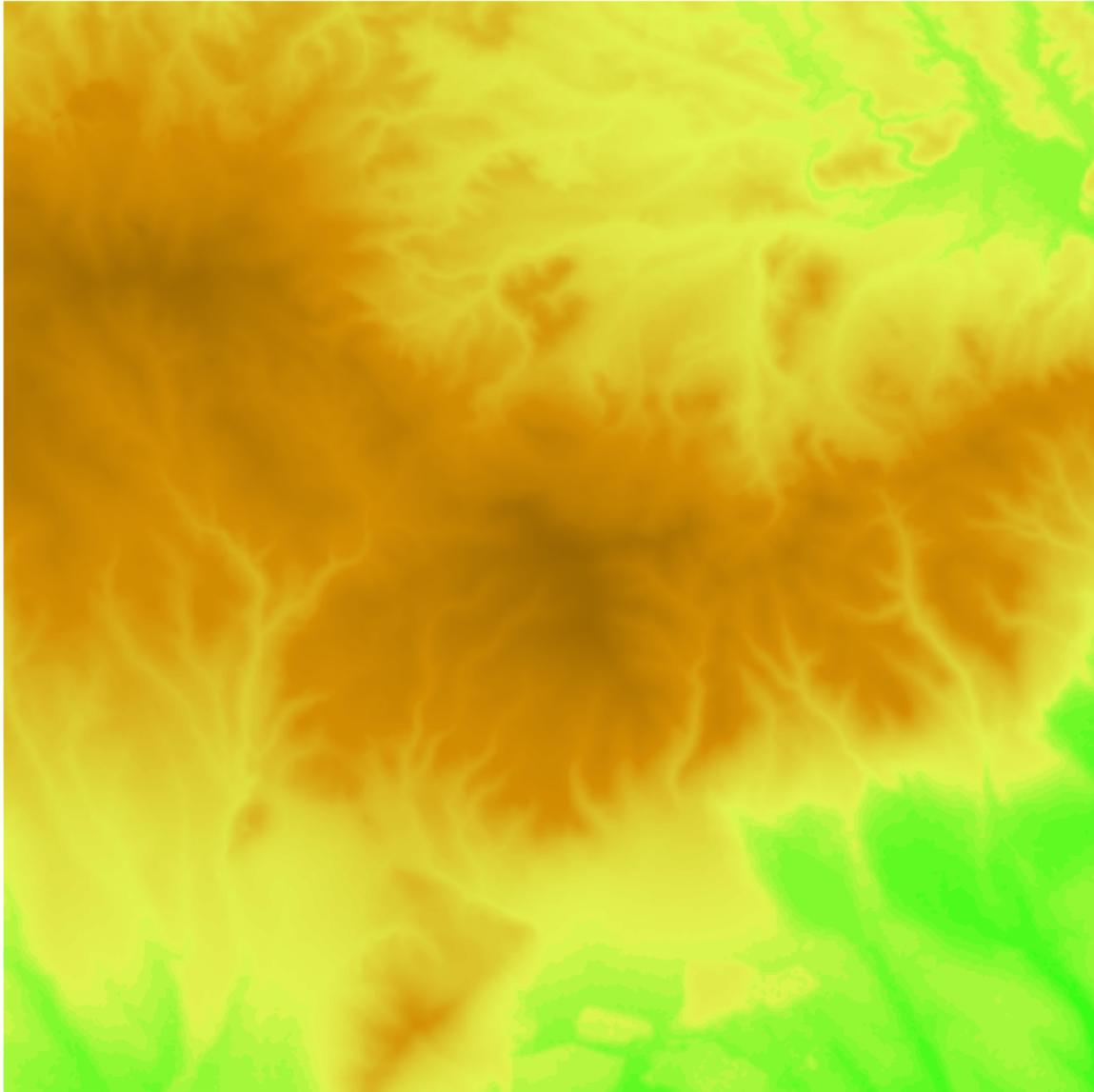


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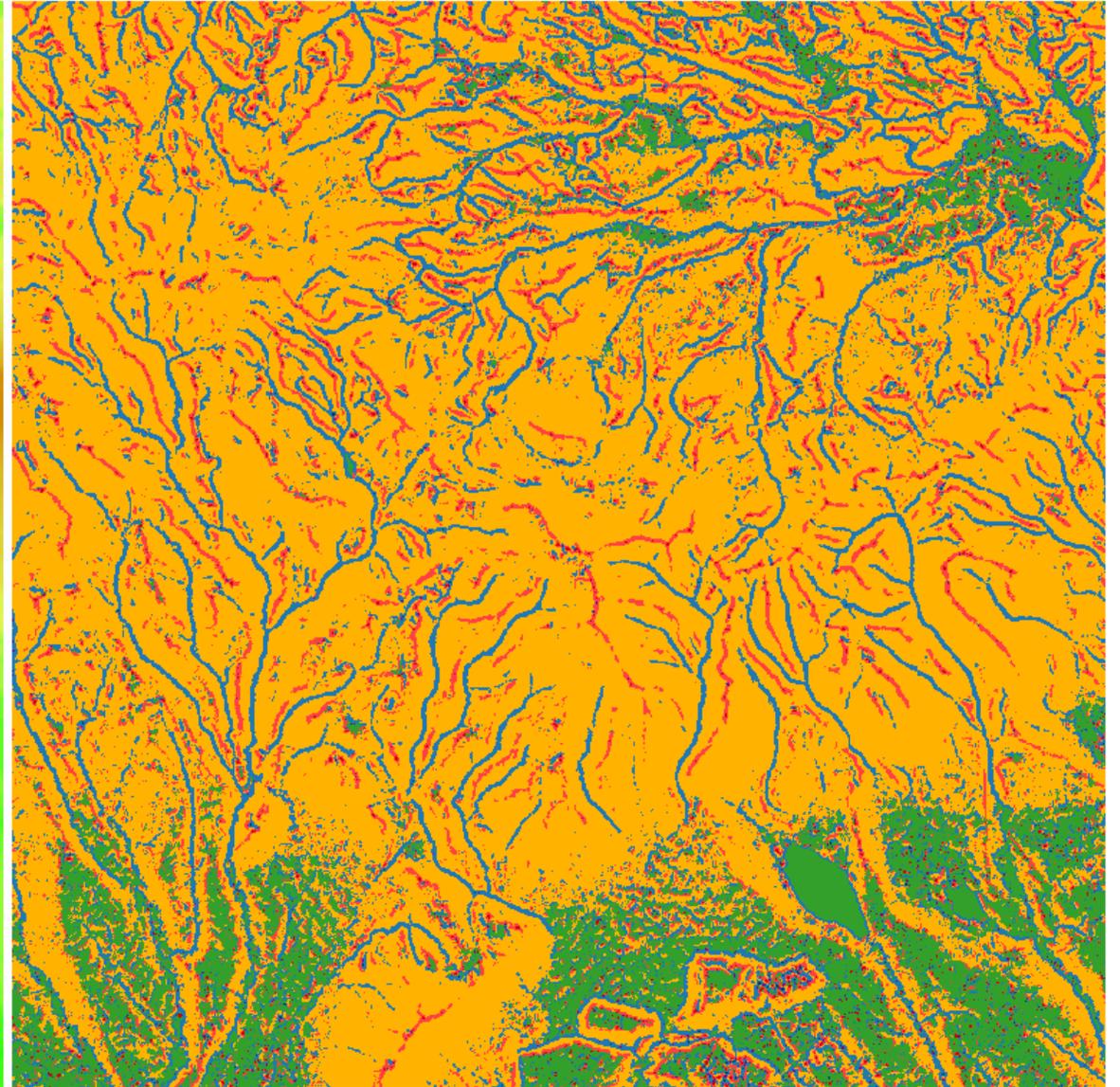


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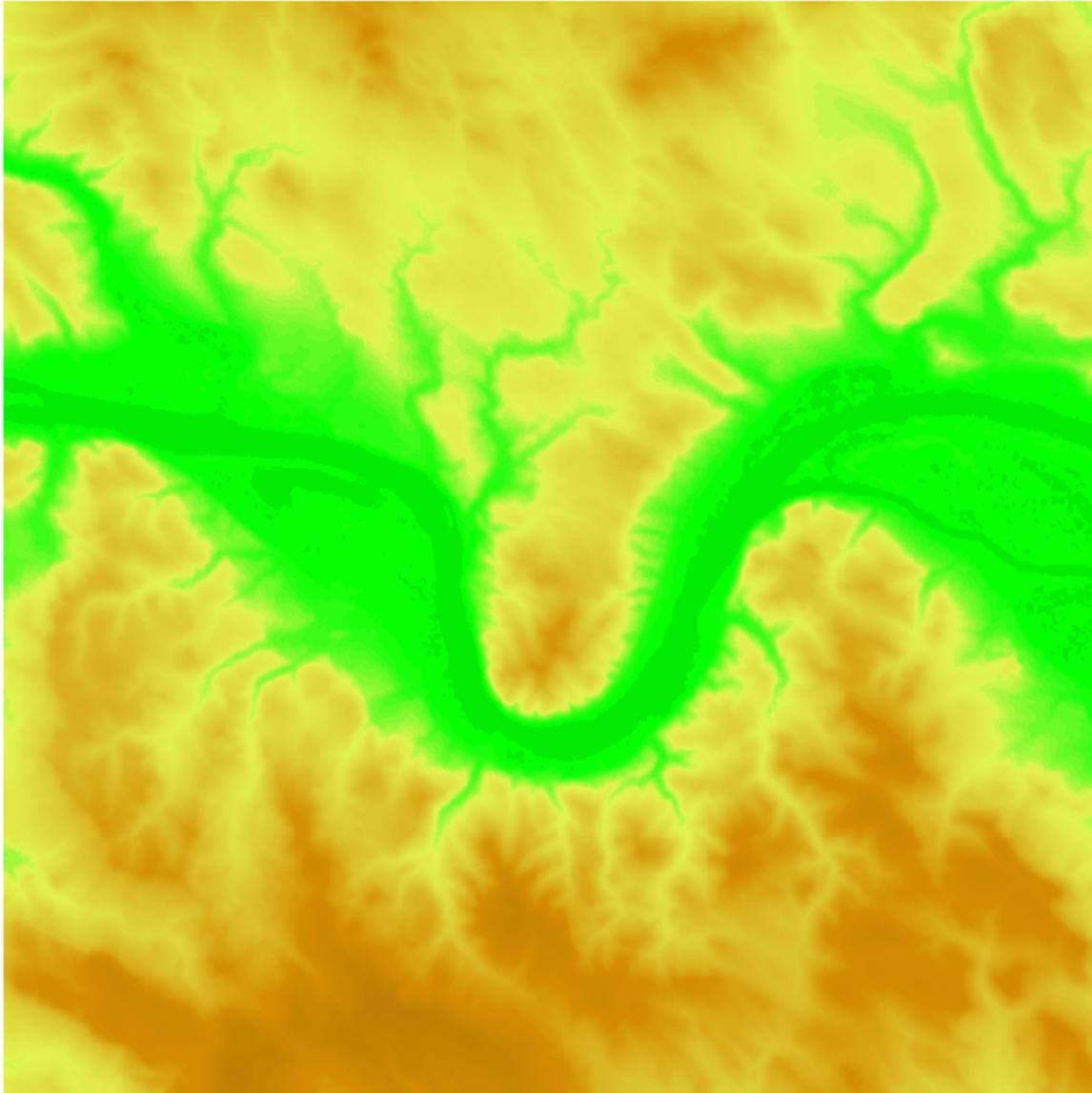


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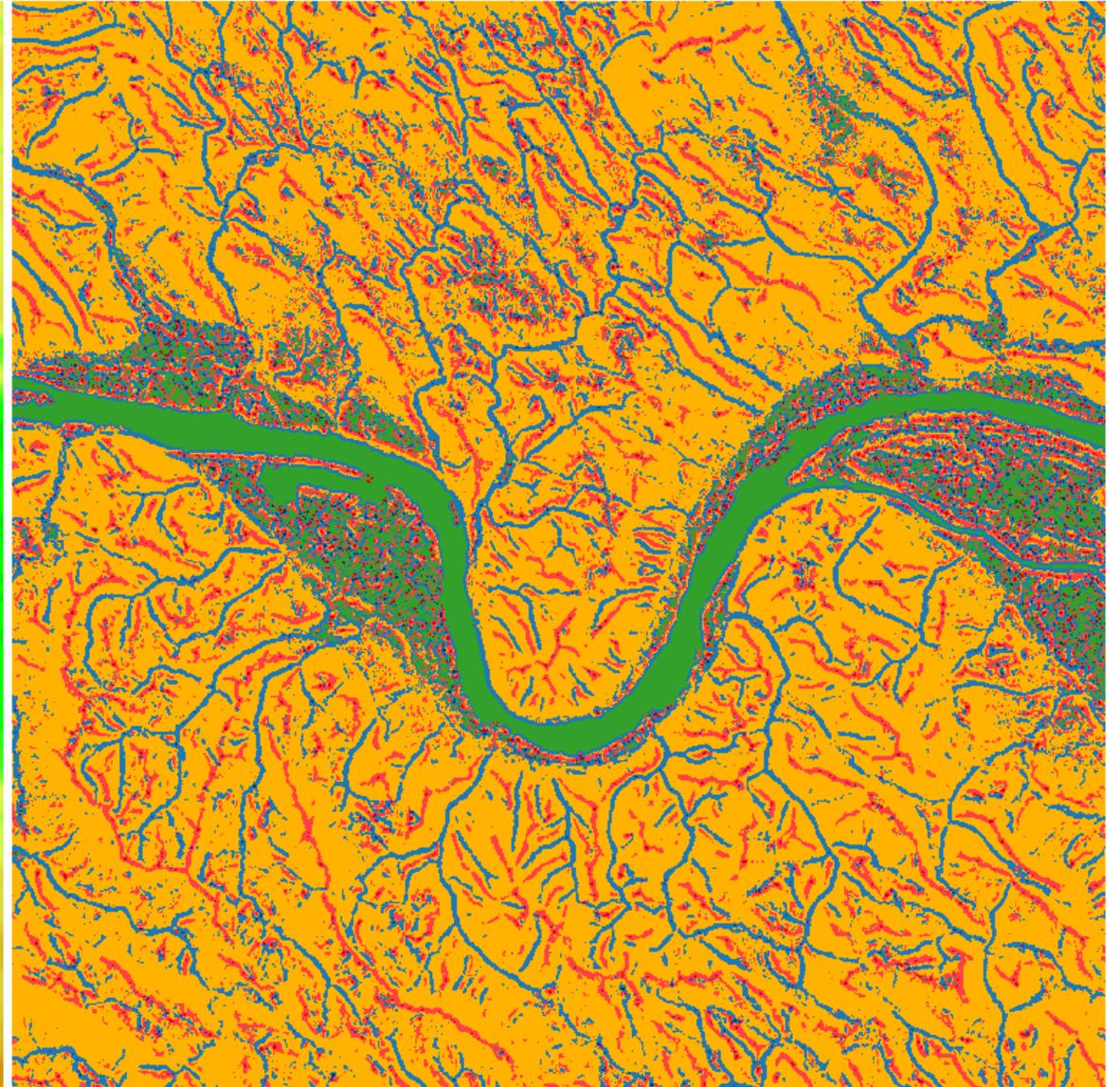


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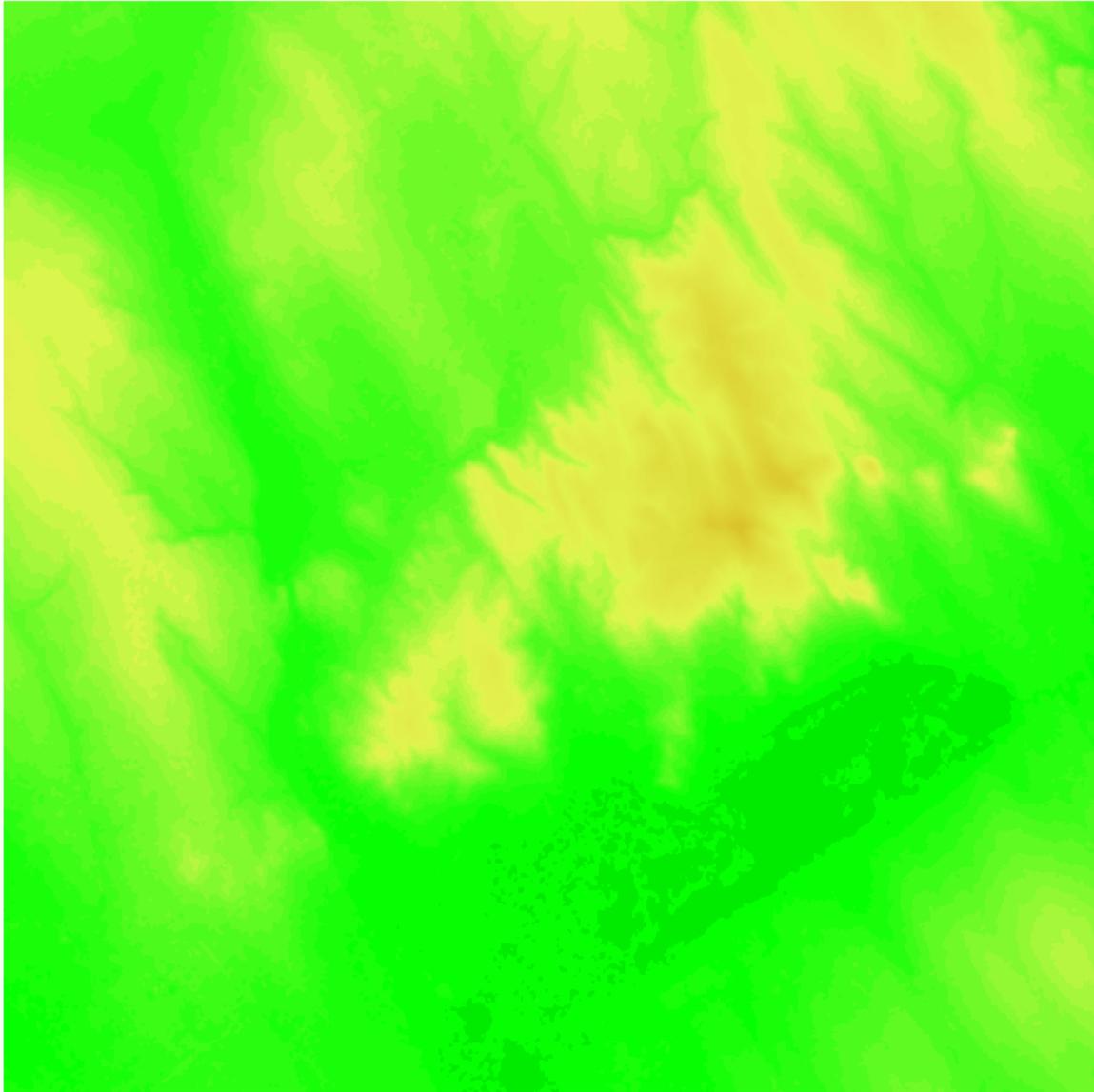


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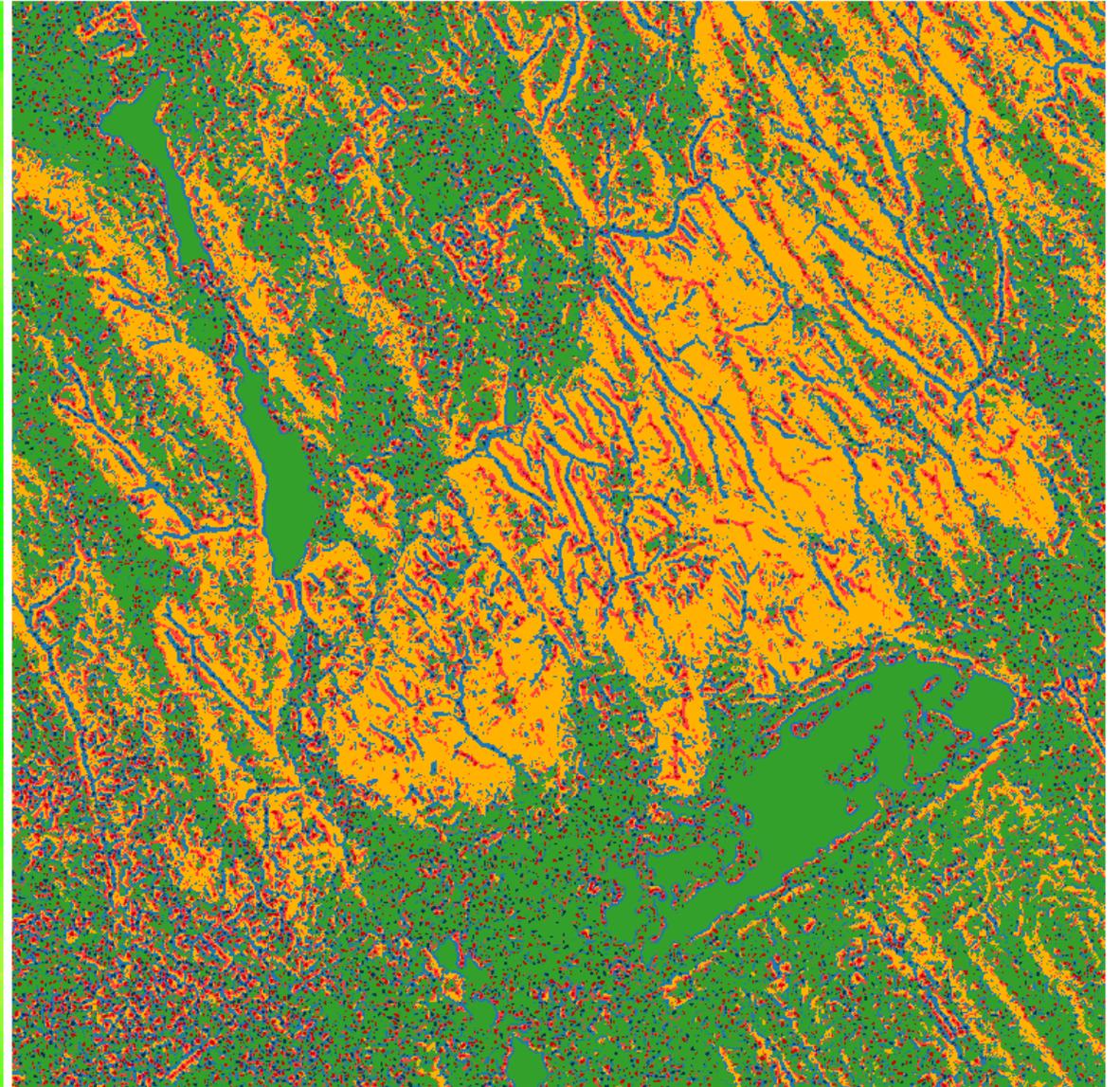


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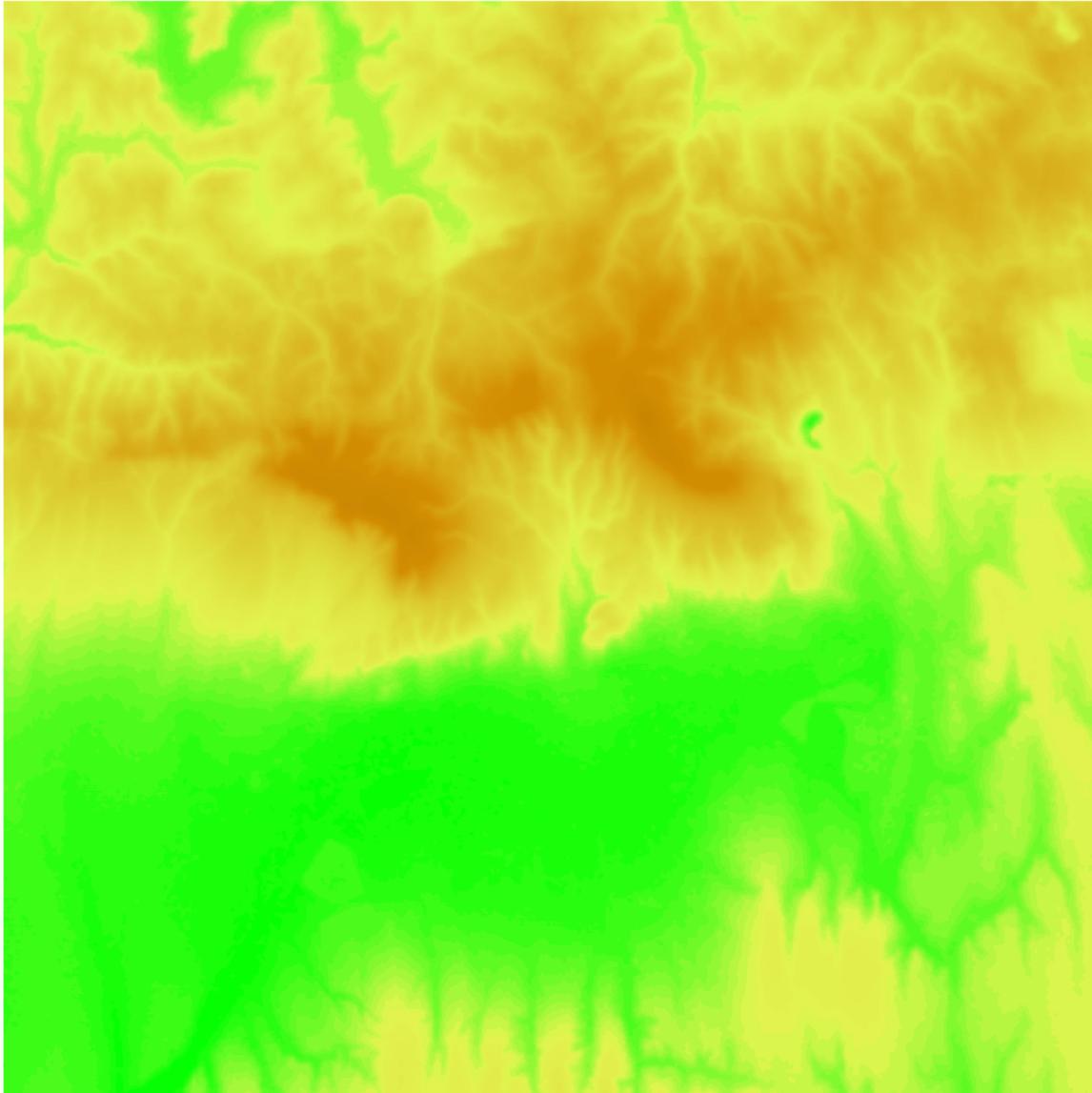


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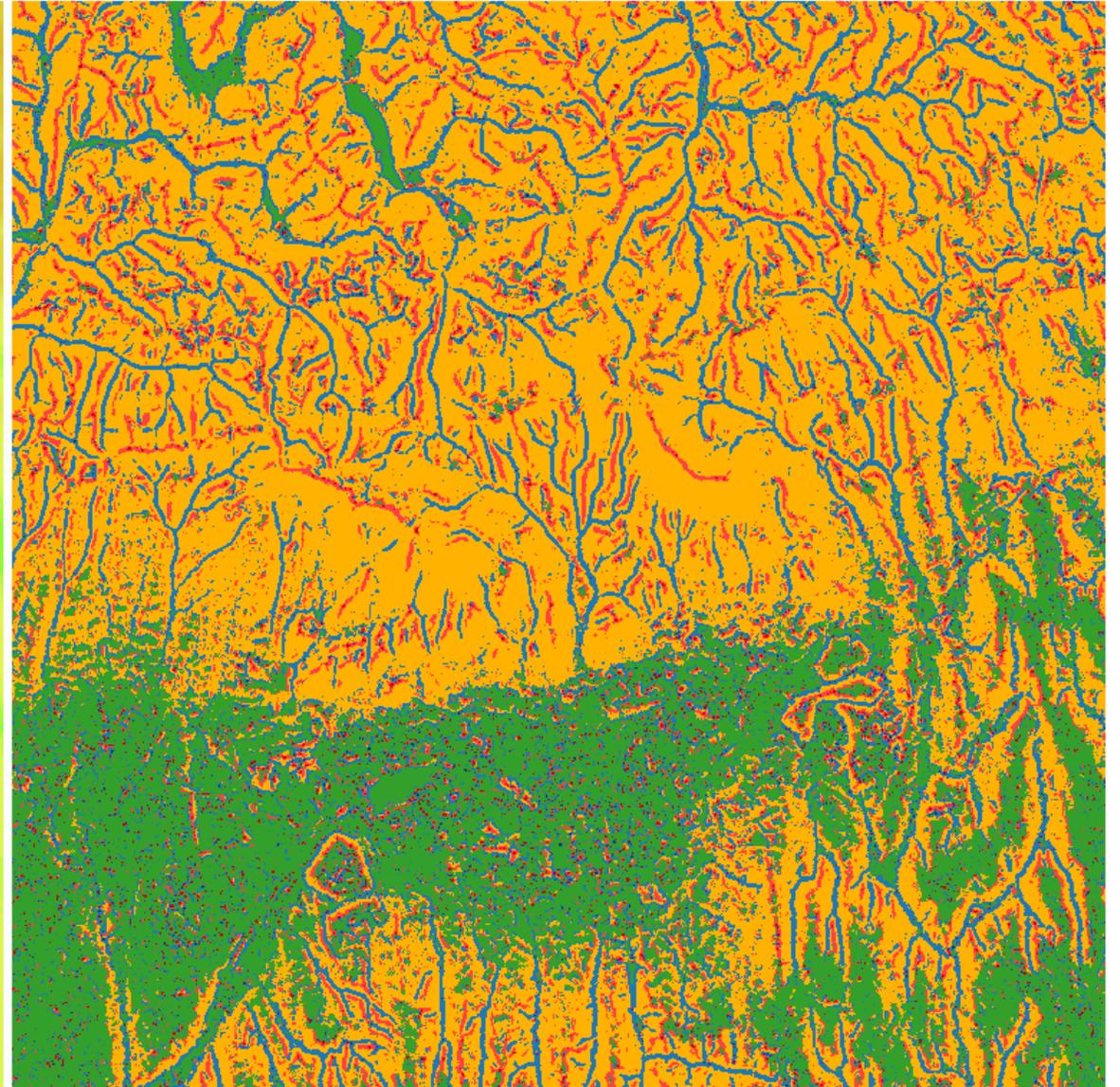


Defuzzification

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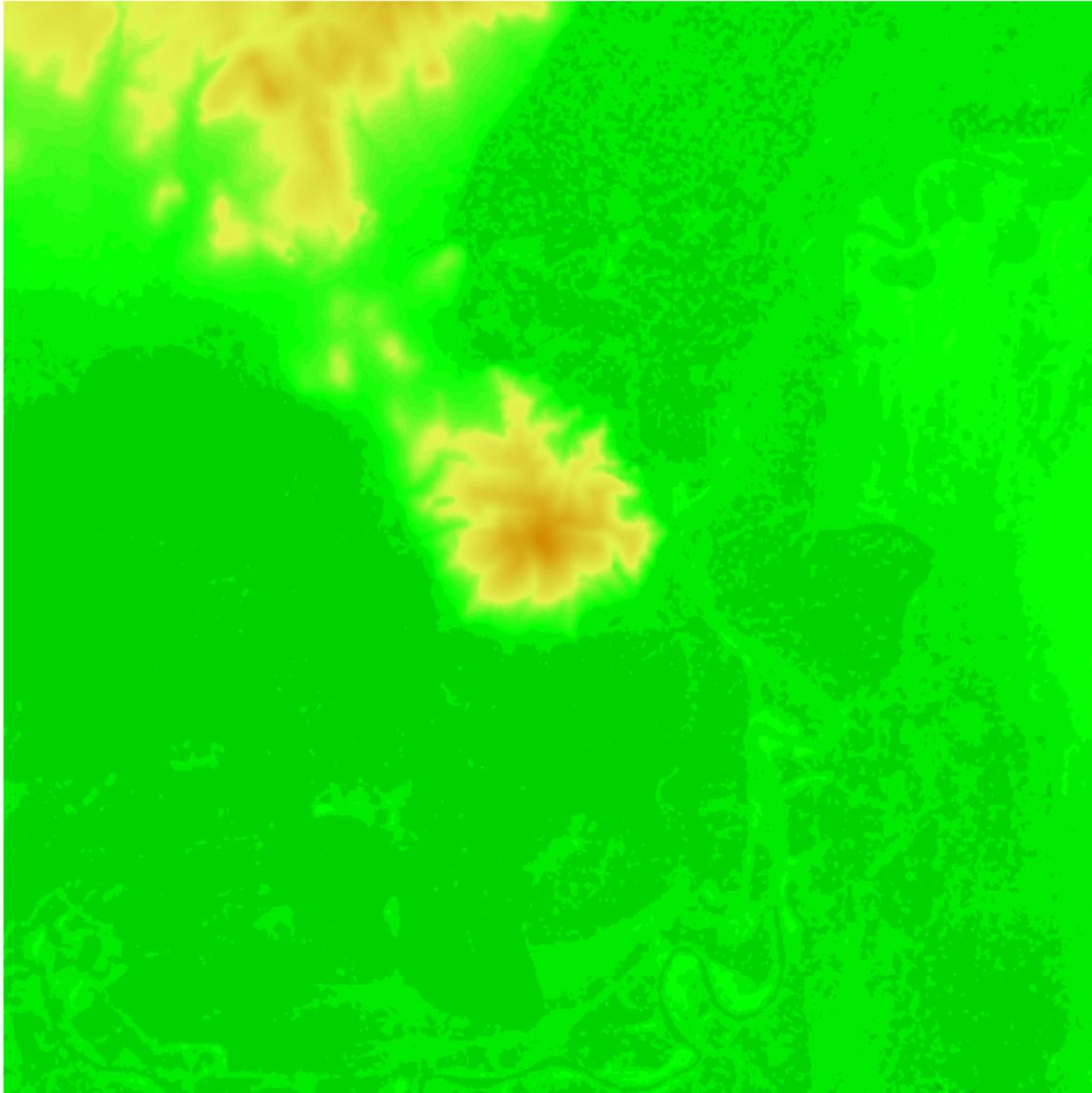


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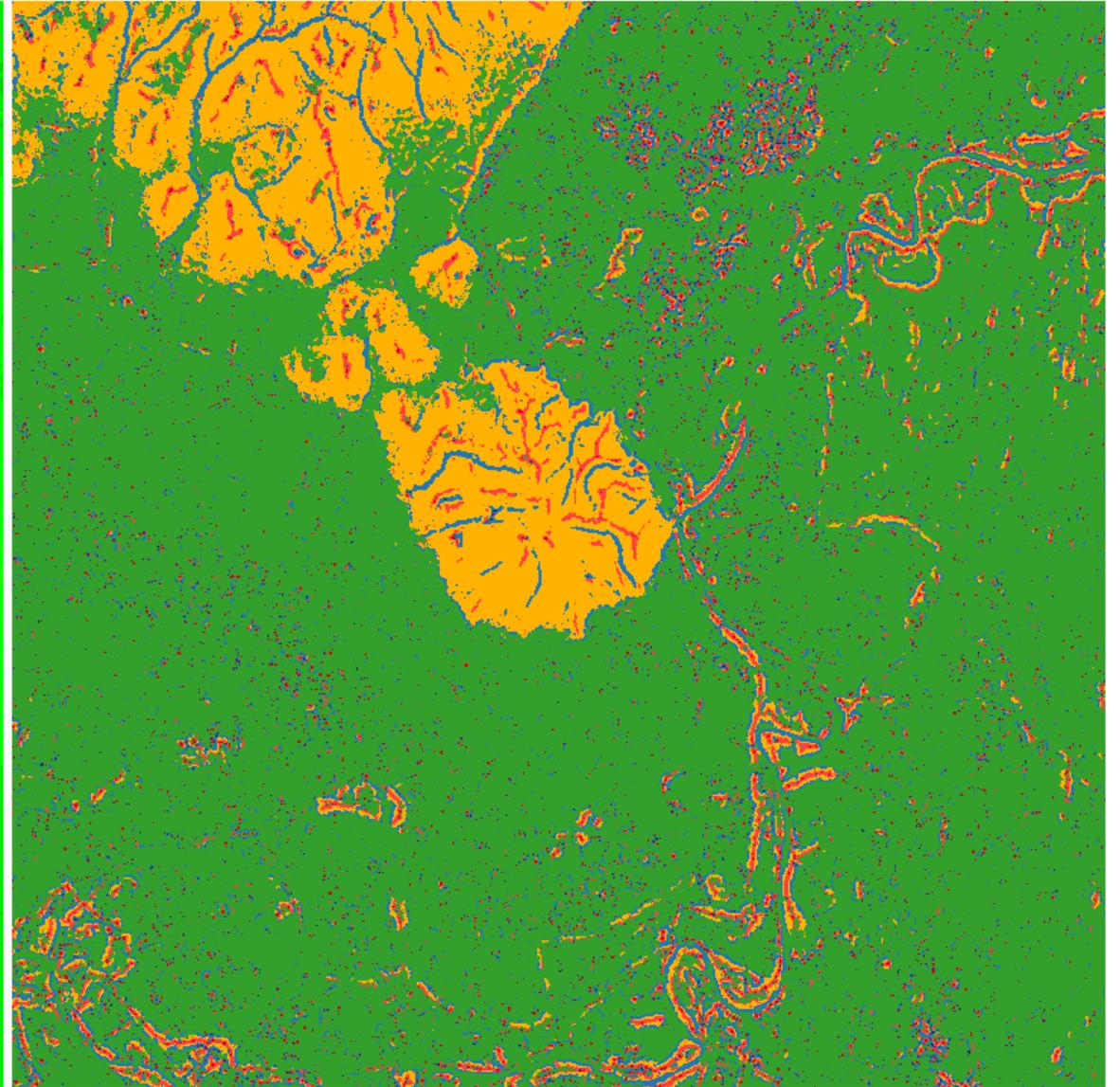


Defuzzification

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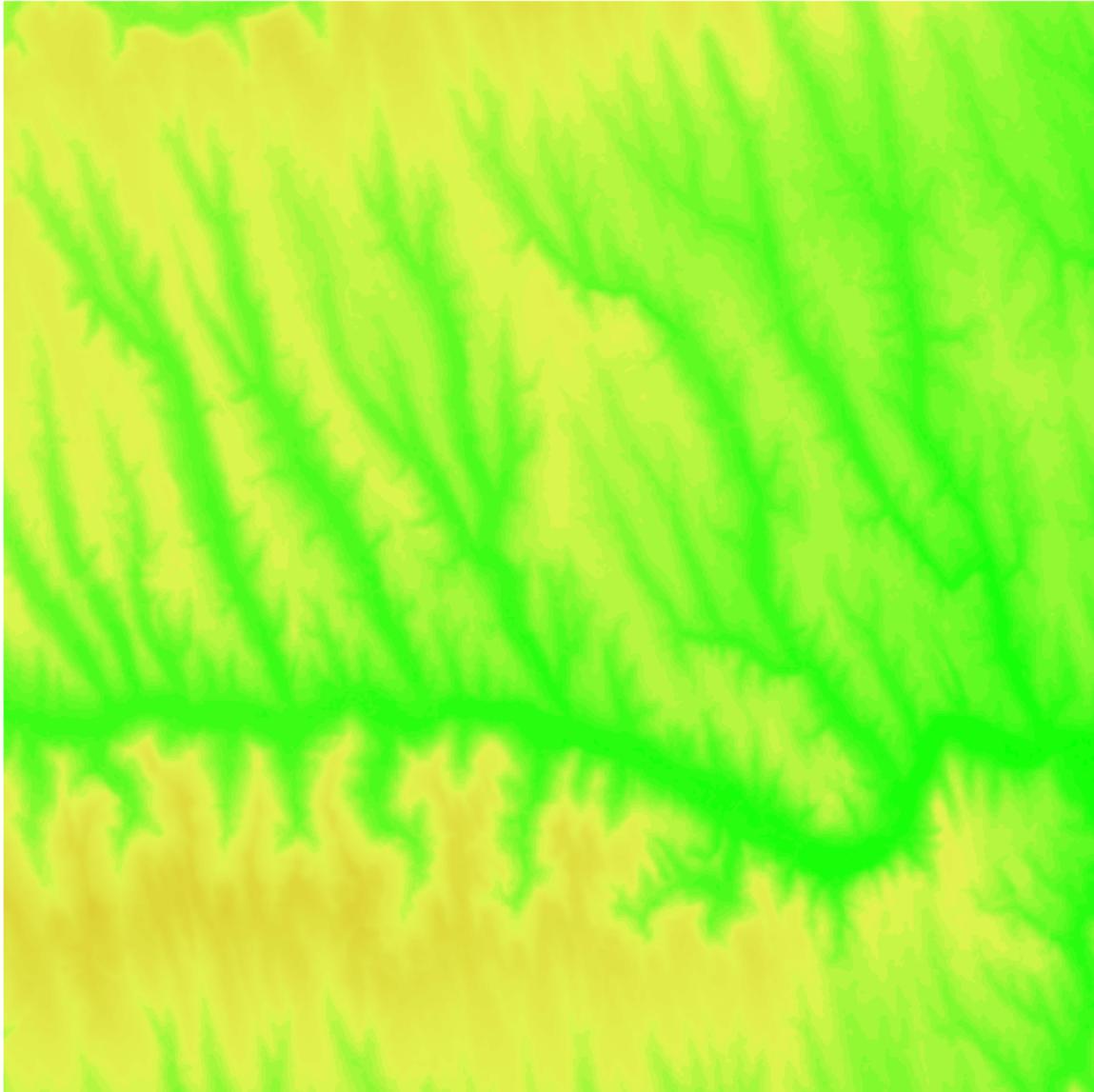


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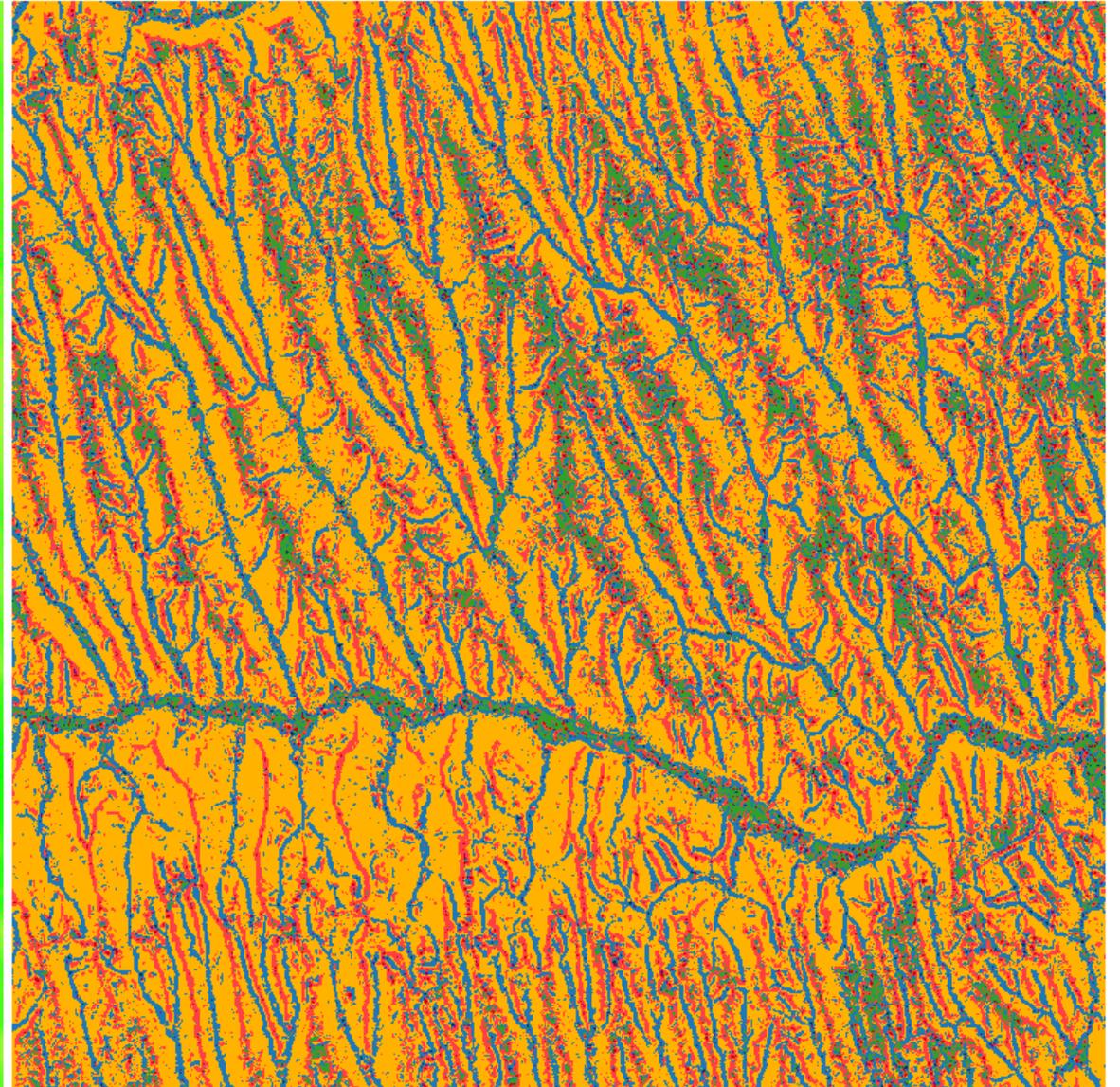


Defuzzyfication

ELEV



DFZ



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