



Slope map derived from IslandDEM v1.0

Product	Slope map of Iceland (in Degrees and Percent units)				
Definition	The slope gradient (slope, slope steepness) identifies the steepest downhill slope for a location in a surface: <i>“the inclination of the land surface with respect to the horizontal plane”</i> Basic local land-surface parameters. First partial derivative from surface.				
Units	Degrees [°], Percent [%]				
Resolution	<table border="1"><thead><tr><th>in Degrees, resolution:</th><th>in Percent, resolution:</th></tr></thead><tbody><tr><td><ul style="list-style-type: none">o 50x50 mo 20x20 mo 10x10 m</td><td><ul style="list-style-type: none">o 50x50 mo 20x20 mo 10x10 m</td></tr></tbody></table>	in Degrees, resolution:	in Percent, resolution:	<ul style="list-style-type: none">o 50x50 mo 20x20 mo 10x10 m	<ul style="list-style-type: none">o 50x50 mo 20x20 mo 10x10 m
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Extent	Iceland				
Keywords	terrain analysis: DEM derivatives, topographic attributes, geomorphometry, first derivatives, steepness , surface parameters				
Category/ application	geomorphology, soil conservation practices, soil mapping, overland flow or channel flow, land management or landscape planning, land capability class, risk and disaster management				
CRS	EPSG:3057 - ISN93 / Lambert 1993 EPSG: 8088 – ISN 2016				
SW	QGIS 3.20.3-Odense, Whitebox Tools version 2.0.0 (Dr. John B. Lindsay © 2017-2021)				
Format	geoTiff, compression deflate				
Data type	Float32				
Calculation	The slope gradient was estimated by Whitebox geotool that uses Horn’s (1981) 3rd-order finite difference method (Gallant and Wilson, 2000) ¹				

¹ Gallant, J. C. and Wilson, J. P. (2000) ‘Primary topographic attributes’, *Terrain Analysis: Principles and Applications*, pp. 51–85.



<p>Conversion from degree to percent and vice versa</p>	<div> </div> <p>Explanation: 100 % means, that a straight line spans the same distance in the length as is does in the height. This is at an angle of 45°.</p> <p>That means, there are possible percentage above 100.</p> <p>!! Formulas for conversion: $angle\ in\ percent = \tan(angle\ in\ degrees) * 100\%$ $angle\ in\ degrees = \text{atan}(angle\ in\ percent / 100\%)$ where: <i>tan</i> is the tangent, <i>atan</i> is the arc tangent.</p>																																																
<p>Landform slope class [%]</p>	<table border="1"> <thead> <tr> <th colspan="2">FAO (2006)² (upper limit %)</th> <th colspan="2">Canadian (2018)³ (upper limit %)</th> <th colspan="2">USDA, (2017)⁴ (lower and upper limit %)</th> </tr> </thead> <tbody> <tr> <td>0.2</td> <td>Flat</td> <td rowspan="4">3</td> <td rowspan="4">Little or no slope</td> <td rowspan="4">0-3</td> <td rowspan="4">Nearly level</td> </tr> <tr> <td>0.5</td> <td>Level</td> </tr> <tr> <td>1.0</td> <td>Nearly level</td> </tr> <tr> <td>2.0</td> <td>Very gently sloping</td> </tr> <tr> <td>5.0</td> <td>Gently sloping</td> <td rowspan="2">9</td> <td rowspan="2">Gentle</td> <td rowspan="2">1-8</td> <td rowspan="2">Gently sloping, Undulating</td> </tr> <tr> <td>10</td> <td>Sloping</td> </tr> <tr> <td>15</td> <td>Strongly sloping</td> <td rowspan="2">16</td> <td rowspan="2">Moderate</td> <td rowspan="2">4-16</td> <td rowspan="2">Strongly sloping, rolling</td> </tr> <tr> <td>30</td> <td>Moderately steep</td> </tr> <tr> <td>60</td> <td>Steep</td> <td rowspan="2">60</td> <td rowspan="2">Extremely Steep</td> <td rowspan="2">20-60</td> <td rowspan="2">Steep</td> </tr> <tr> <td>>60</td> <td>Very steep</td> </tr> <tr> <td></td> <td></td> <td>>60</td> <td>Excessively Steep</td> <td>>45 (60)</td> <td>Very steep, cliffs</td> </tr> </tbody> </table>	FAO (2006) ² (upper limit %)		Canadian (2018) ³ (upper limit %)		USDA, (2017) ⁴ (lower and upper limit %)		0.2	Flat	3	Little or no slope	0-3	Nearly level	0.5	Level	1.0	Nearly level	2.0	Very gently sloping	5.0	Gently sloping	9	Gentle	1-8	Gently sloping, Undulating	10	Sloping	15	Strongly sloping	16	Moderate	4-16	Strongly sloping, rolling	30	Moderately steep	60	Steep	60	Extremely Steep	20-60	Steep	>60	Very steep			>60	Excessively Steep	>45 (60)	Very steep, cliffs
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² Food and Agriculture Organization (FAO) (2006) *Guidelines for Soil Description*, Food and Agriculture Organization of the United Nations (UN, FAO). doi: 10.1016/S0341-8162(99)00067-3.

³ NSDB Canada <from https://sis.agr.gc.ca/cansis/nsdb/slc/v3.2/lst/lf_slope.html>

⁴ USDA (2017) 'Soil Survey Manual Introduction', *Public Law*. doi: 10.1097/00010694-195112000-00022.



Landform slope class [°]	Canadian (2018) ⁵ (upper limit °)		USDA, (2017) ⁶ (lower and upper limit °)	
	2.0	Little or no slope (3%)	Nearly level (0-3%)	
	5.0	Gentle (9%)	Gently sloping, Undulating (1-8%)	
	9.0	Moderate (16%)	Strongly sloping, rolling (4-16%)	
	16.0	Steep (30%)	Moderately steep, hilly (10-30%)	
	30	Extremely Steep (60%)	Steep (20-60%)	
	>30	Excessively Steep (>60%)	Very steep (>45 ≈25°)	
	30-55			Extremely Steep with risk of avalanches

⁵ NSDB Canada <from https://sis.agr.gc.ca/cansis/nsdb/slc/v3.2/lst/lf_slope.html>

⁶ USDA (2017) 'Soil Survey Manual Introduction', *Public Law*. doi: 10.1097/00010694-195112000-00022.