Comparison of two different terrestrial photography-methods in rill erosion research

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Introduction

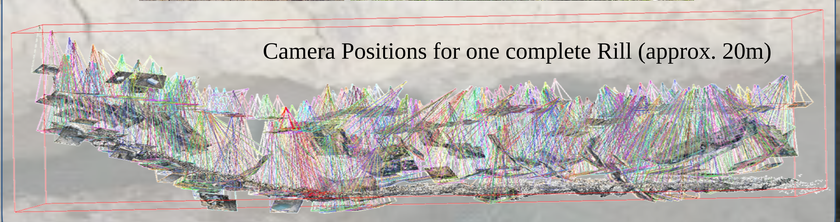
- Important task in rill erosion research: Detecting differences in rills before and after a natural or experimental runoff event → volume and sources of eroded material
- Precondition: accurate 3-D model of the rill before and after runoff
- Typical method for 3-D surface modelling: terrestrial laser scanning
- Disadvantage: highly expensive
- Alternative, budget friendly option: terrestrial photography
- Presented here: comparison of two different methods

Study Area

	Latxaga	La Tejería
Geology	Clay marls Grey marls	Marls Sandstones
Climate	PRECIP: 835 mm a^{-1} Ø Temp.: 12° C	PRECIP: 725 mm a^{-1} Ø Temp.: 13° C
Texture	Silty-clay-loam	Clayey-silty
Land Use	agricultural	agricultural
Area	207 ha	169 ha

Casalí et al. (2008): Runoff, erosion, and water quality of agricultural watersheds in central Navarre (Spain); Agricultural Water Management 95: 1111 – 1128

Method 1: Free-hand Photographies

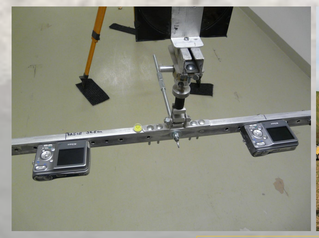


Used Camera

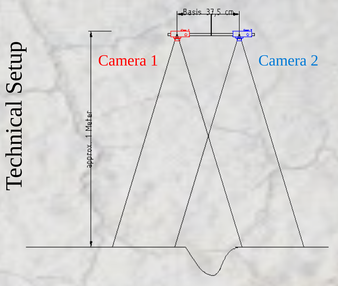
Nikon D80
Resolution: 3872 x 2592
Sensor: 23.6 x 15.8 mm
CCD: 10.75 MPX
AF-S DX Nikkor 18-70
Focal Length: 18-70 mm,

Used Software

Method 2: Stereo Photographies



Technical Setup

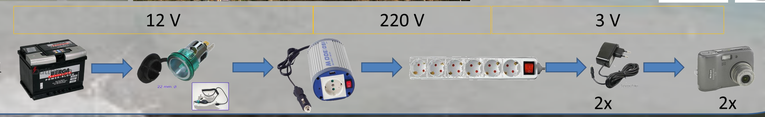


Used Camera (2x)

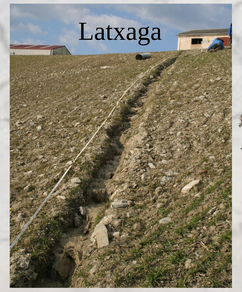
Nikon Coolpix L2
Resolution: 2816 x 2112
Sensor: 1/2.5 " (5.76 x 4.3 mm)
CCD: 6 MPX
Focal Length: 38-116 mm

Used Software

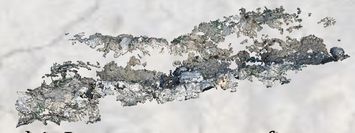
Field Energy Supply Chain



Results



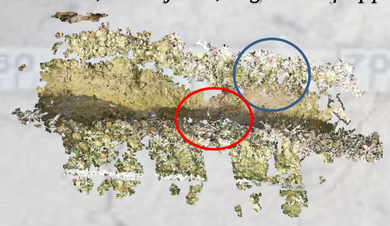
Method 1, La Tejería, segment of approx. 2m



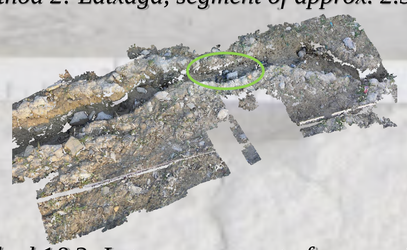
Method 1, Latxaga, segment of approx. 1.5m

Method 2, La Tejería, segment of approx. 2m

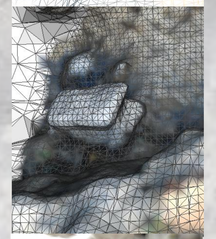
Method 2: Latxaga, segment of approx. 2.5m

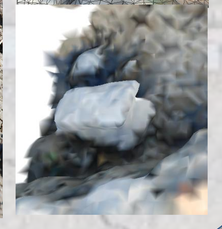


Method 1&2, La Tejería, segment of approx. 2m



Method 1&2: Latxaga, segment of approx. 2.5m

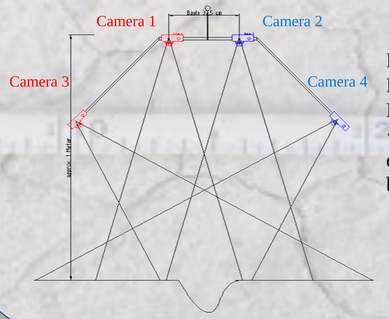




Conclusion

	Method 1	Method 2
Advantages	• Easy handling in the field • Overhangs in sidewalls detectable	• Lower data quantity • **Result‘s quality in general**
Disadvantages	• Bulky data quantity • **Result‘s quality in general**	• More complicated in the field • Overhangs not detectable

Best result: Combination of the image sets from both methods,
Problem: bulky data quantity



Future:
Double Stereo Photography
→ Overhangs detectable without bulky data quantity

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