



LIME: Ainsa Test Dataset

Background

This test project gives an introduction on how to work with LIME, to get a feel for the possibilities and potential of supplementing our fieldwork and excursions with state-of-the-art 3D modelling. LIME is a piece of software developed by the Virtual Outcrop Geology Group. The software is a lightweight viewer of large virtual 3D models, allowing visualisation, simple interpretation and measurement, and integration of additional field data.

The Ainsa project is a training dataset for LIME users. The dataset allows users to explore the technical functionality of LIME. The 3D model has been geologically interpreted according to Vipond (2005), although note that only a simplified version is provided. The training dataset gives an example of how LIME can be used for 3D model visualisation and interpretation. It is based on a virtual 3D model acquired and processed from UAV photogrammetry. The dataset resides on [V3Geo](https://v3geo.com) and is loaded directly from the cloud when opening the project – see the outcrop description on V3Geo for more info.

Further resources, including tutorial videos, are on virtualoutcrop.com/lime/resources.

Data accreditation

Dataset ©VOG Group – Ainsa outcrop model is from [V3Geo](https://v3geo.com)

Unauthorised distribution or publication of this dataset is prohibited without written consent.

Reference

Vipond, E.B., 2005: *Modelling Small-Scale Heterogeneities in a Channelised Turbidite System: Digital Outcrop Study from the Ainsa I Turbidite System*. Master Thesis, Department of Earth Science, University of Bergen, Norway. 208 pages.

Abbreviations used for the lithology

SST	Sandstone
GCL	Conglomerate
HET	Heterolithics (mix of sand beds and mud beds)
MST	Mudstone
pMST	Pebbly mudstone

Lines

Different types of lines have been interpreted from the 3D outcrop model. The positions of sedimentary logs are indicated by white lines. Six types of boundary surfaces have been interpreted (see legend below). The lines have been organised in six folders in the LIME project (*Logs*, *ErosionSurface_base*, *Mudstone_base*, *PebblyMudstone_base*, *Sandstone_base*, *Conglomerate*)

Legend	Colour	Name
	White	Log position
/	Red	Base of erosion surface
/	Light blue	Base of mudstone
/	Purple	Base of pebbly mudstone
/	Yellow	Base of sandstone
/	Orange	Base of conglomerate

Planes

Example orientation planes have been measured in the LIME project, indicating examples of joints and beddings. Planes can be displayed as ellipses or rectangles.

Panels

Four panels demonstrate some of the uses of panels.

Interpretations (Panel2_Ainsa_interpreted_filled.png)

This vertical panel can be filled with geological interpretation and can contain different objects. For example, lines interpreted on the 3D model can be projected to and exported as an image file. In an external image editor software (e.g. paint.net) the image can be edited. E.g. polygons can be filled, or areas marked/annotated. Afterwards the edited image can be loaded as a new layer on the *Interpretation* panel and projected onto the 3D model.

<i>Legend</i>	<i>Colour</i>	<i>Name</i>
■	Light blue	Mudstone
■	Yellow	Sandstone
■	Orange	Sandstone with erosive base

Satellite image (Satellite_image_Ainsa.tif/tfw)

This horizontal panel is a georeferenced image showing context around the 3D model.

Log 17, Log 18 (Log17_ainsa.png, Log18_ainsa.png)

Panels representing sedimentary logs. The 3D model can be textured with the projected log images.

Legend for the sedimentary log (Vipond, 2005)

<u>Clast, grains and fragments</u>		<u>Structures</u>	
Masive sandstone/mudstone		Erosion, scours and load structures	
Grains coarser than host lithology Eg. granules and/or pebbles		Sand injection structures	
Sandstone clasts		Soft sediment deformation	
Borrows in clast		Plane parallel lamination	
Mudstone clasts		Current ripple cross lamination	
Rafts		Borrows with relative coarse fill with dark coating	
Nummulites		Ophiomorpha	
Shell fragments		Thalassinoides	
Plant detritus		J-shaped borrow	
Horizon with plant detritus so it appears flacky		Paleoflow measurements direction	
Amalgamation surface with plant detritus with mud clasts		strike dip of bed	
Nodules			
Photo			
Not exposed			
Poorly exposed			
<u>Sedimentary facies</u>		<u>Facies association</u>	
F1: Thin to very thick bedded sandstones -F1a: Non graded -F1b: Normal graded -F1c: Inversly graded		FA1: Channel axis fill	
F2: Sandy conglomerate		FA2: Heterolithic's	
F3: Muddy, fine grained sandstone		FA3: Slump andm muddy debris flows	
F4: Mudstone		FA4: Mudstone	
F5: Matrix supported, pebbly mudstone			