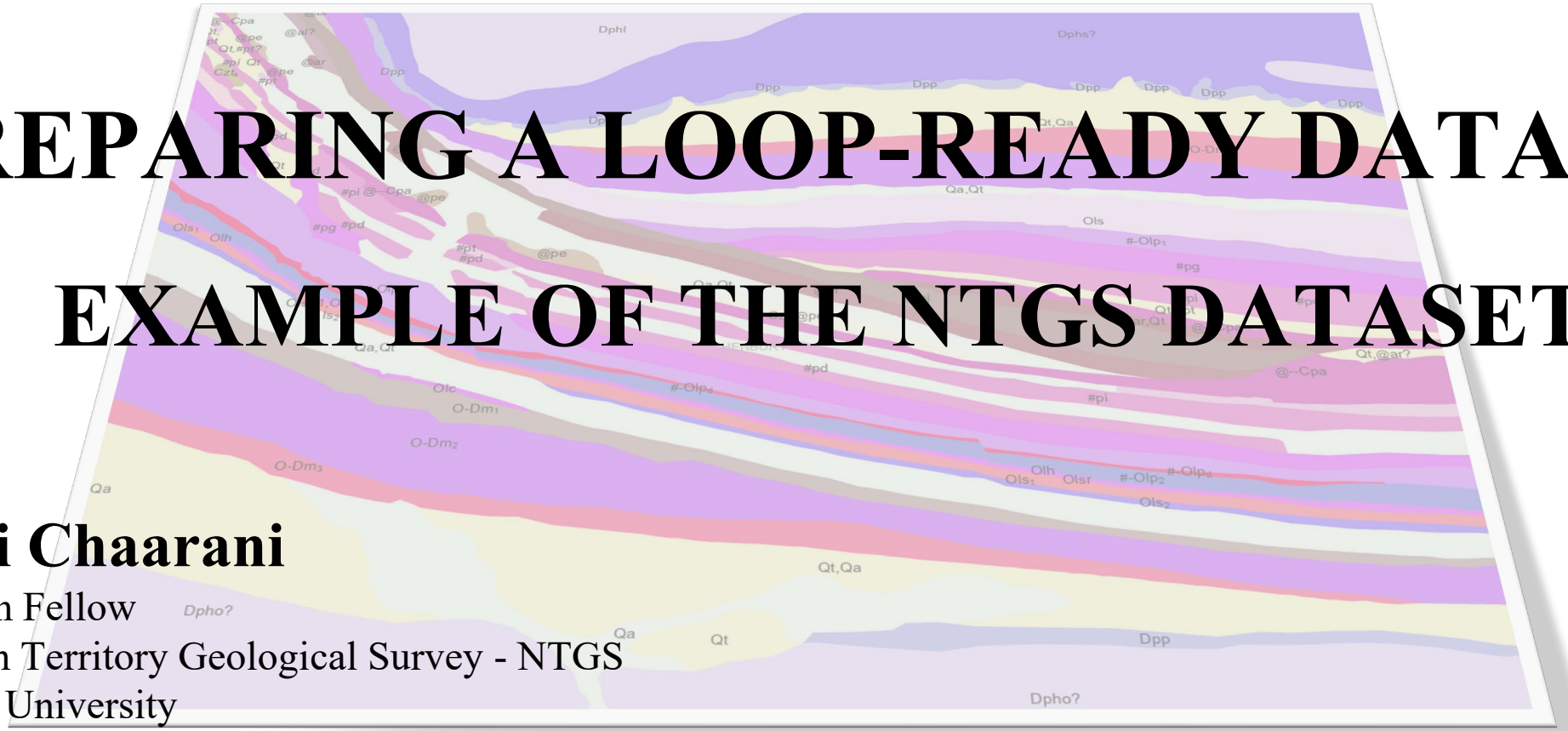
PREPARING A LOOP-READY DATASET

EXAMPLE OF THE NTGS DATASET



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What we will be looking at

- What are the data requirements of Map2Loop
- How to convert a geological dataset to a Loop-compatible dataset
- Almost invisible problems to keep in mind
- A 3D Model from the Amadeus Basin, Northern Territory

Map2Loop data requirements: files

Shapefile example name	Shape file description	Geometry Type
Geological_units.shp	stratigraphic or lithological units	Polygon
Linear_Features.shp	faults and axial traces	LineString
Orientation_data.shp	bedding measurements, foliations etc.	Point

Attribute requirements: Orientation data

Example Attribute name	Variable name	Data Type	Required / optional	Description
Strike	“dipdir_column”	Integer	Required	Strike (using the right hand rule)
Dip	“dip_column”	Integer	Required	Dip
Desc	“desciption_column”	String	Optional	deformation event or foliation type (eg. ‘s0’).
Overturned	“overturned_column”	String	Optional	Text field indicating if bedding measurements are overturned (eg. ‘overturned’)
geopnt_id	“objectid_column”	Integer / String	Optional	unique ID

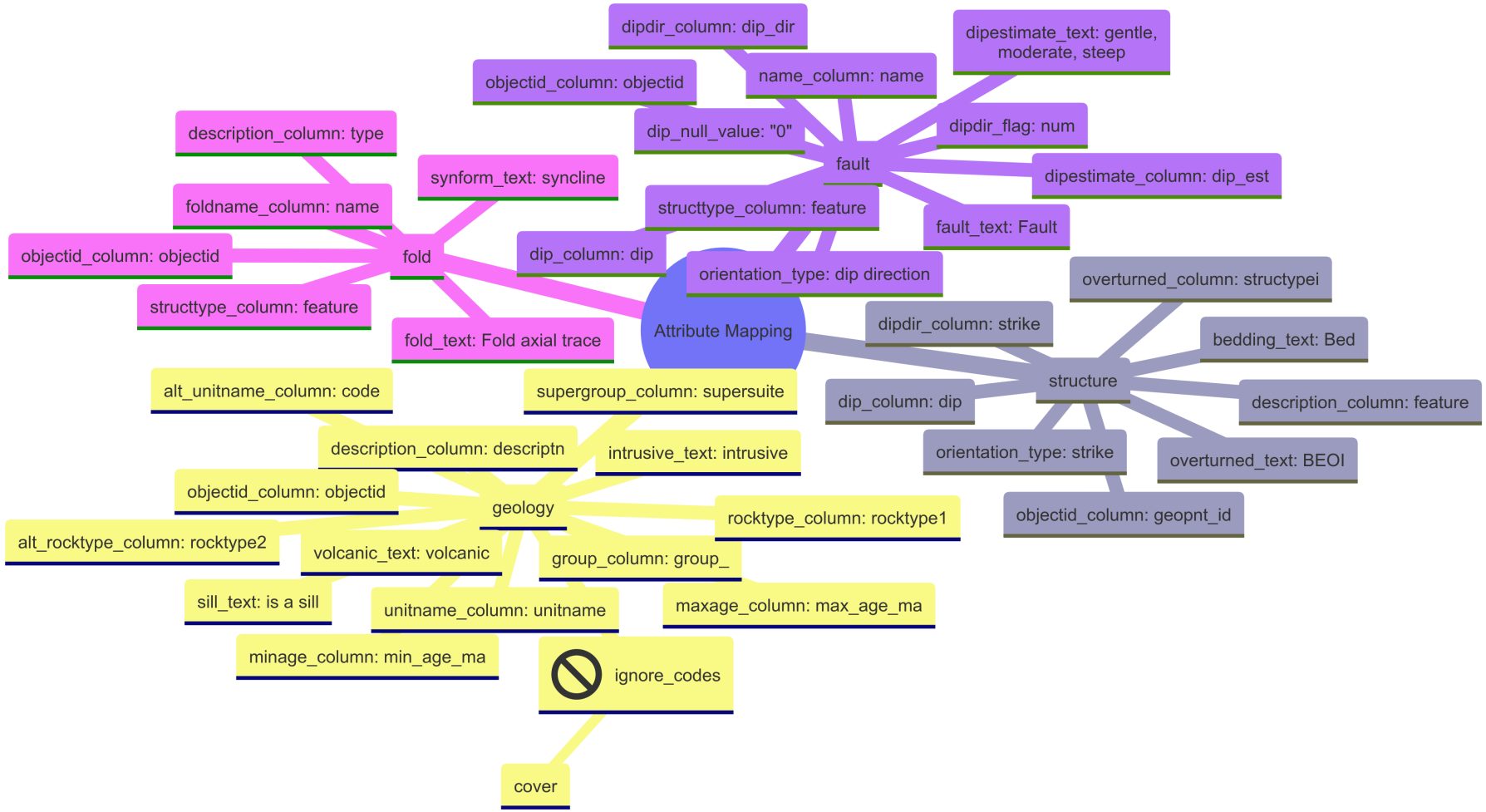
Attribute requirements: Linear features

Example Attribute name	Variable name in Map2Loop	Data Type	Required/ optional	Description
Feature	“structtype_column”	String	Required	Structure type: Fault, Fold
Dip	“dip_column”	Integer	Optional	Dip – if not available, Dip = 90
DipDir	“dipdir_column”	Integer	Required	Dip Direction
Name	“name_column”	String	Optional	Name of linear feature: e.g.,fault 1, fold B
Id	“objectid_column”	Integer / String	Optional	unique ID

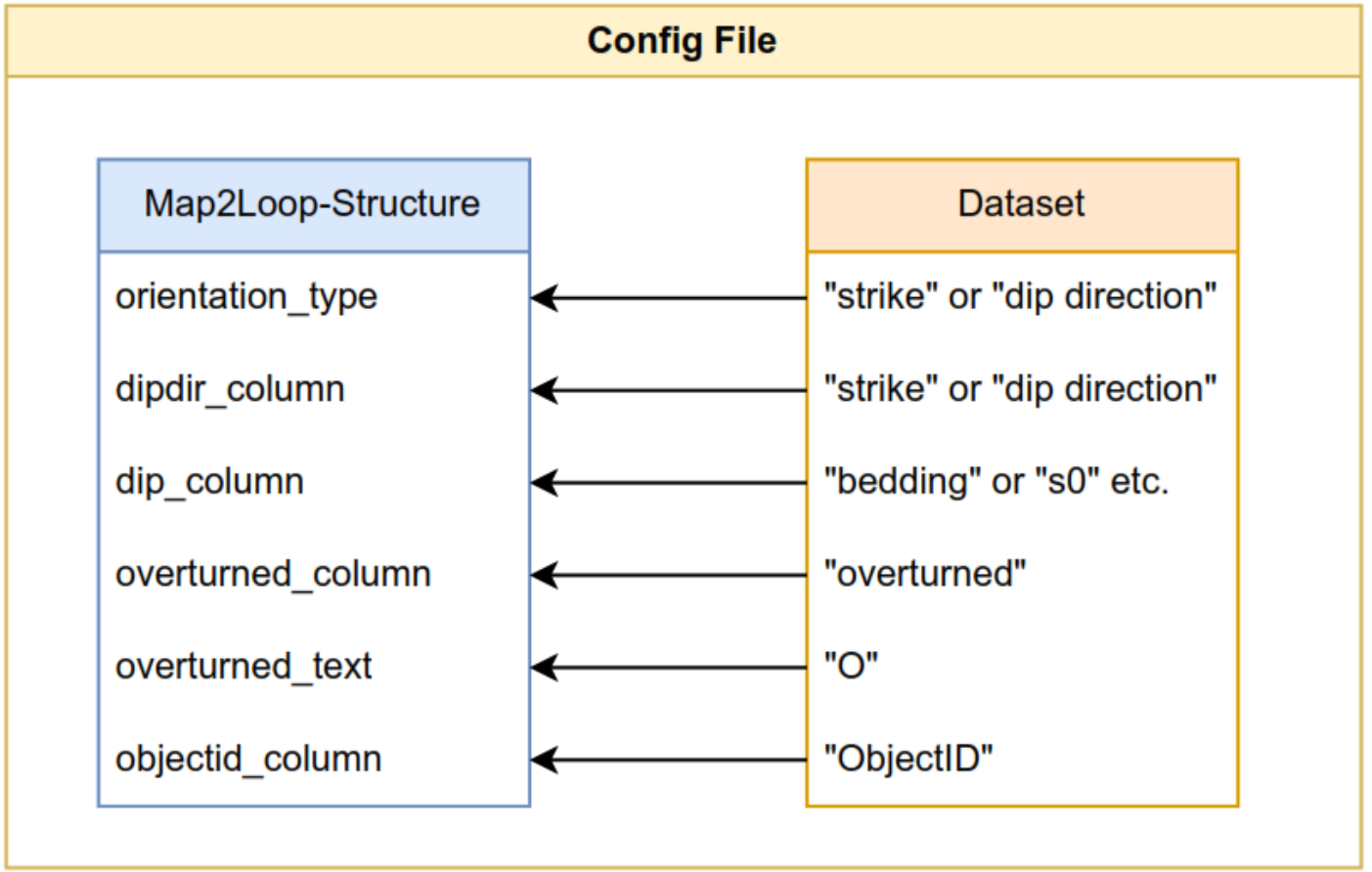
Attribute requirements: Geological units

Example Attribute name in QGIS	Variable name in Map2Loop	Data Type	Required /Optional	Description
supergroup	“supergroup_column”	String	Optional	Supergroup name
group	“group_column”	String	Optional	Group name
Formation/Lithology	“unitname_column”	String	Required	Formation name
Alt_unit	“alt_unitname_column”	String	Required	Field containing alternate stratigraphic unit names
min_age	“minage_column”	Integer	Optional	Minimum unit age
max_age	“maxage_column”	Integer	Optional	Maximum unit age

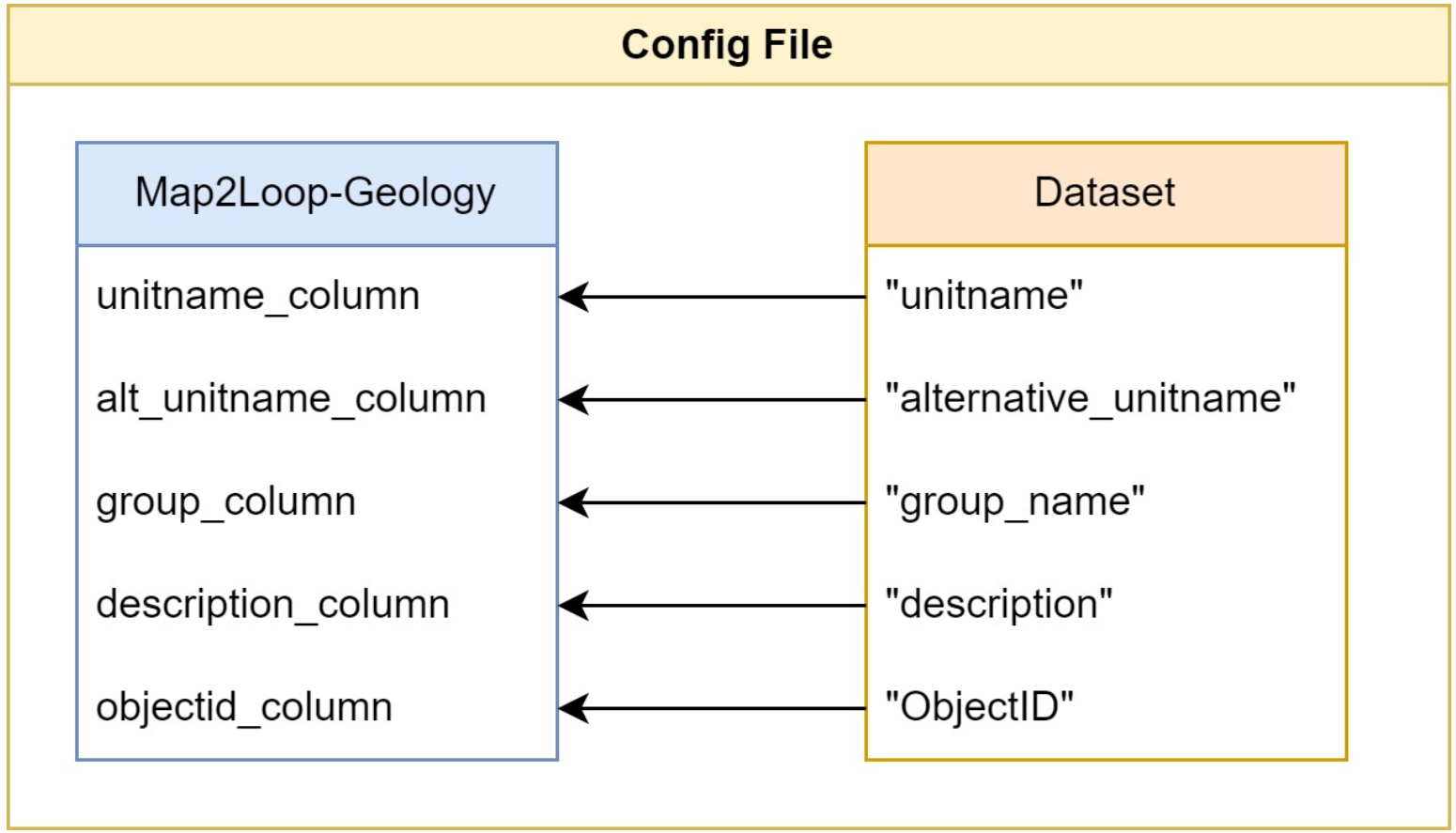
Mapping Attributes to Map2Loop: The config file



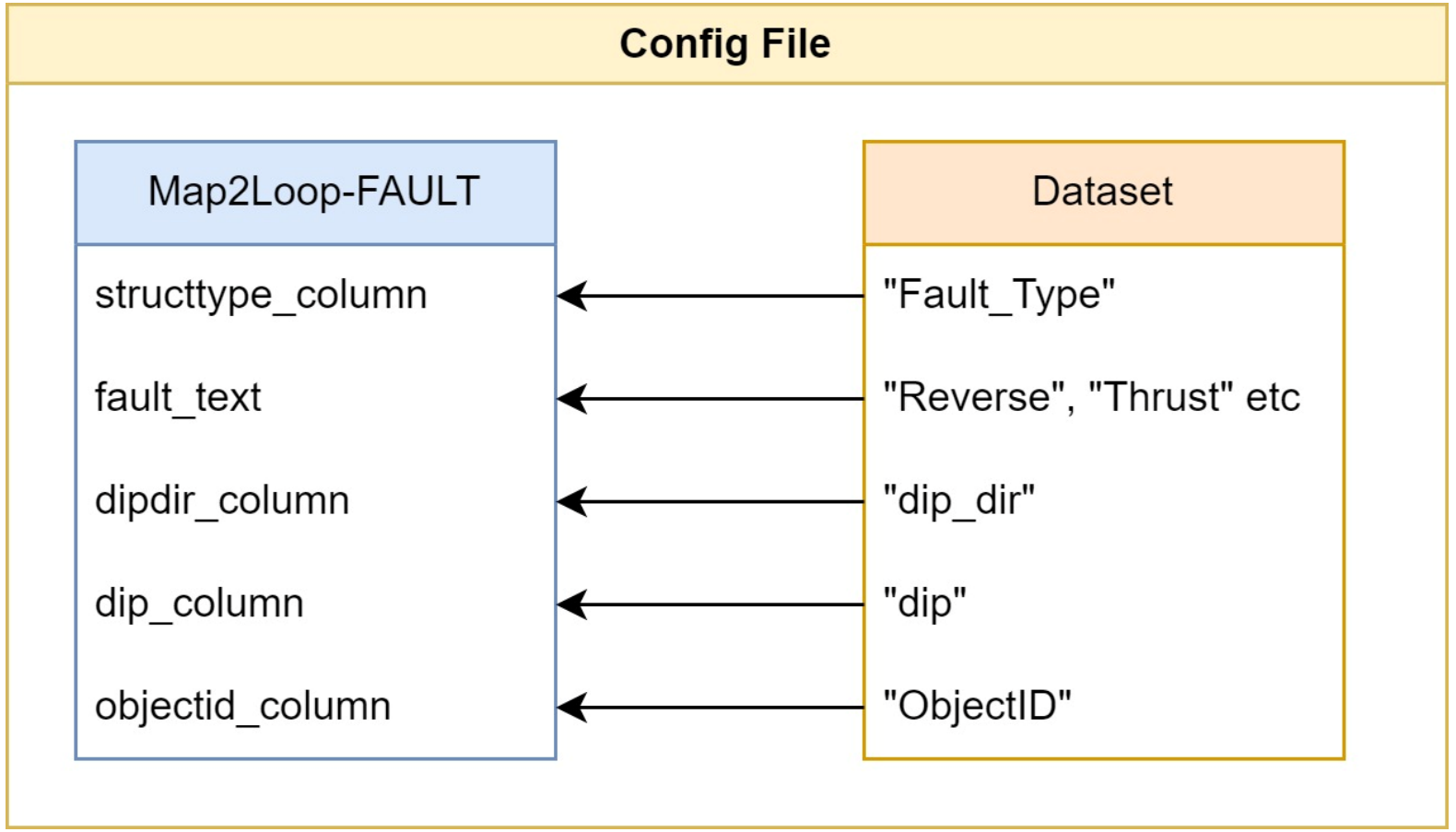
Mapping Attributes to Map2Loop: The config file



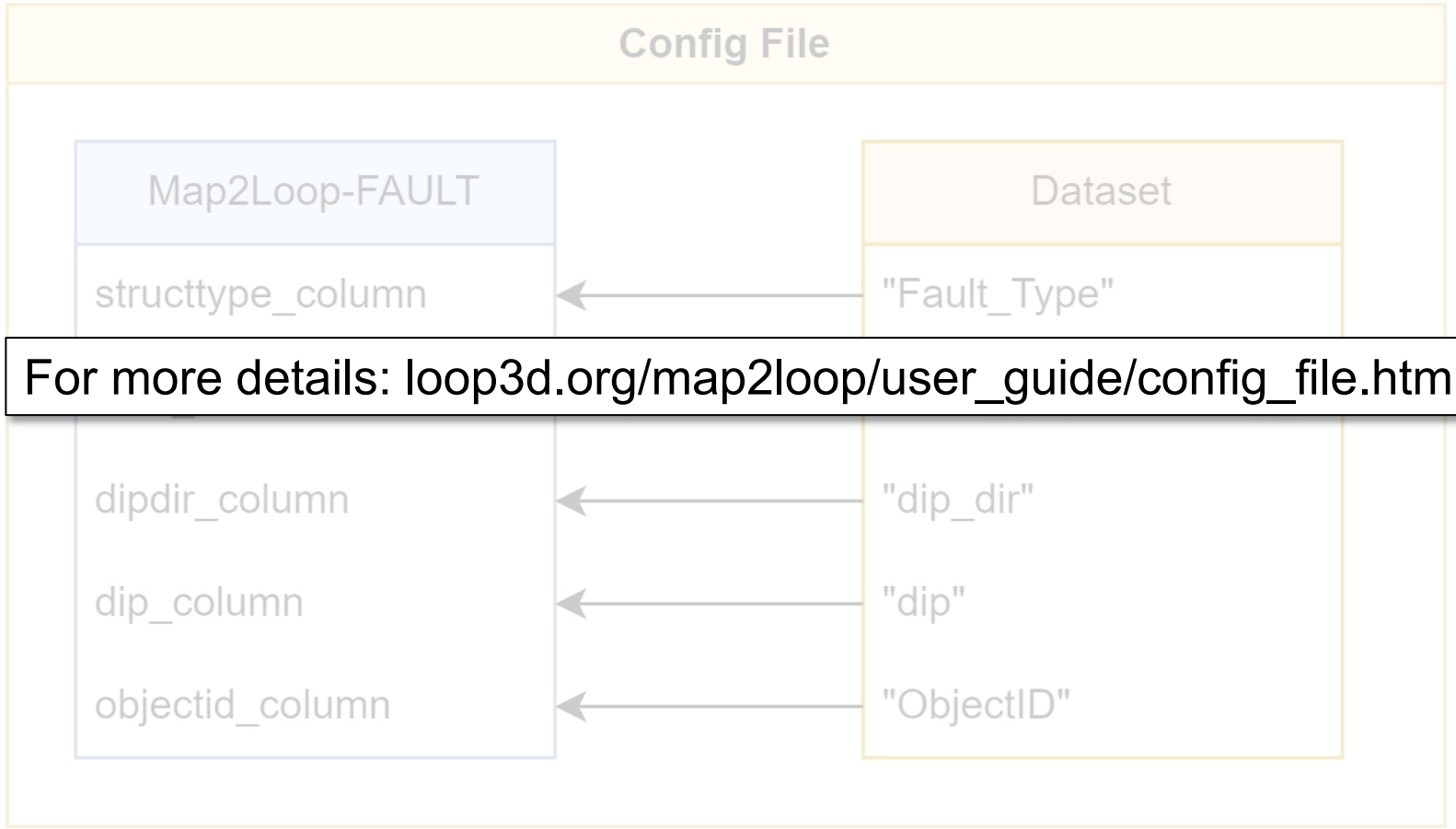
Mapping Attributes to Map2Loop: The config file



Mapping Attributes to Map2Loop: The config file



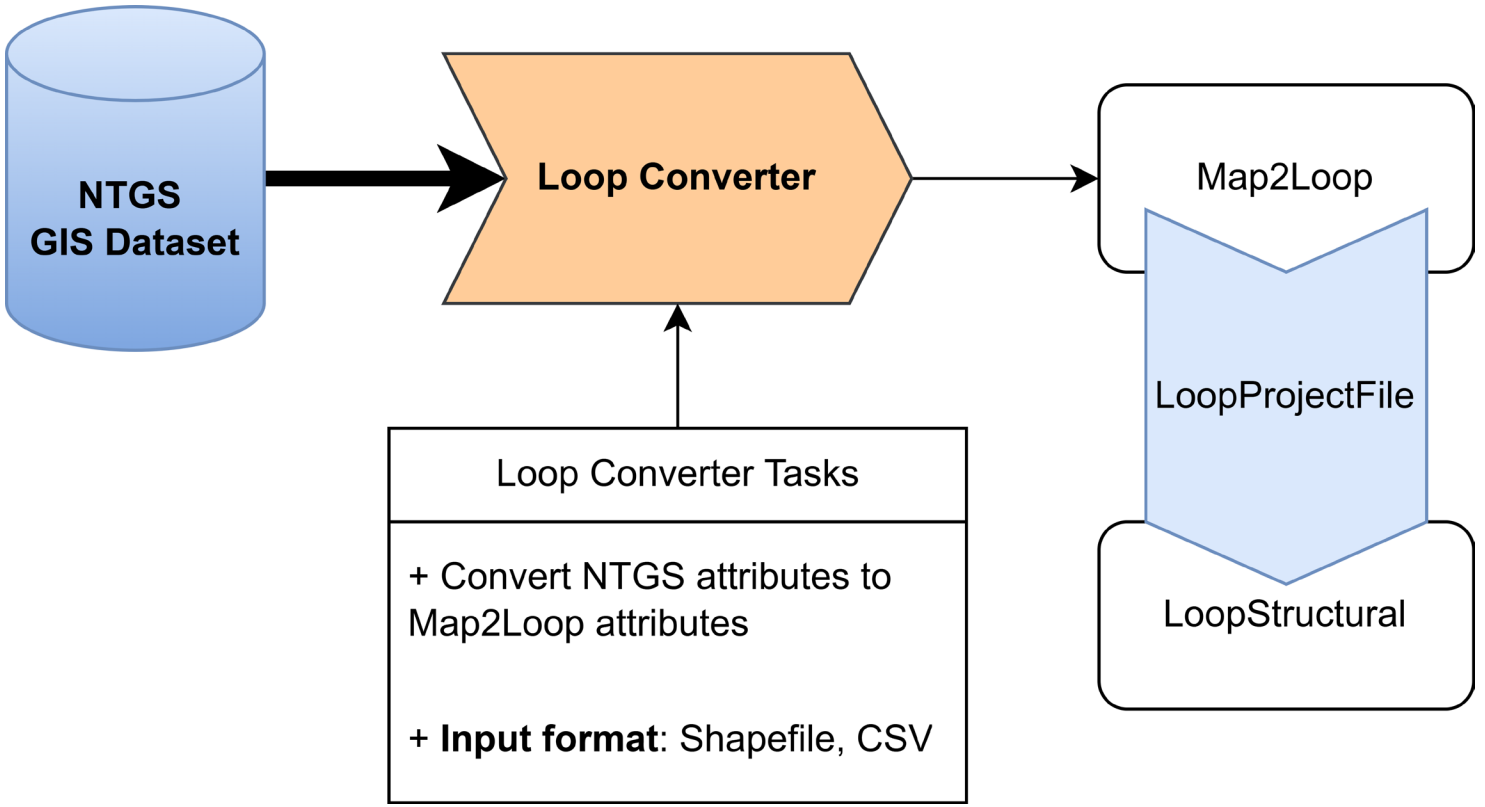
Mapping Attributes to Map2Loop: The config file



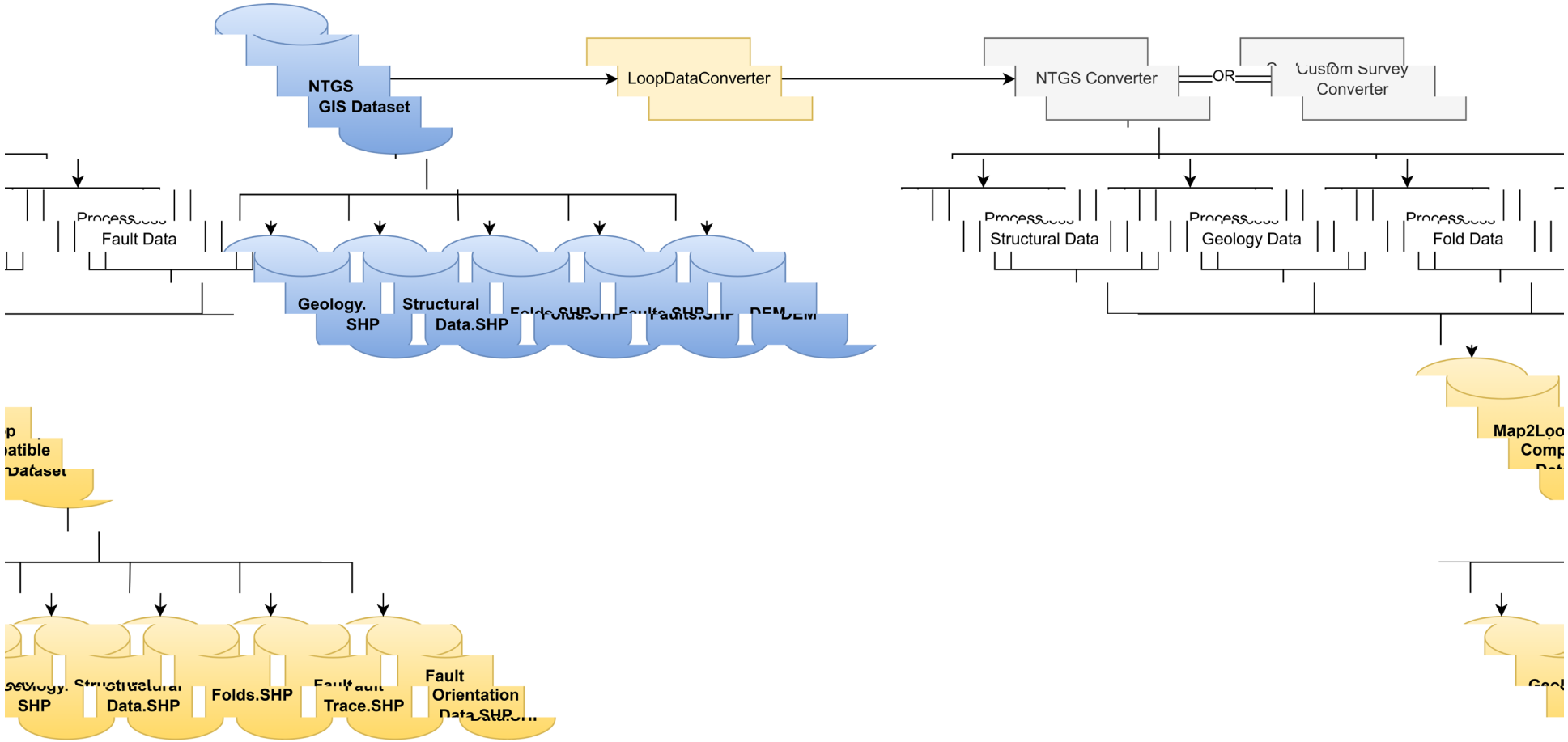
Data Type Conversion: The Manual Approach

Example Attribute name	Variable name	Map2Loop Data Type	NTGS Dataset Data Type
Strike	“dipdir_column”	Integer	String
Dip	“dip_column”	Integer	String
Desc	“desciption_column”	String	String
Overturned	“overturned_column”	String	String
geopnt_id	“objectid_column”	Integer / String	Integer

The Automatic Approach: LoopDataConverter

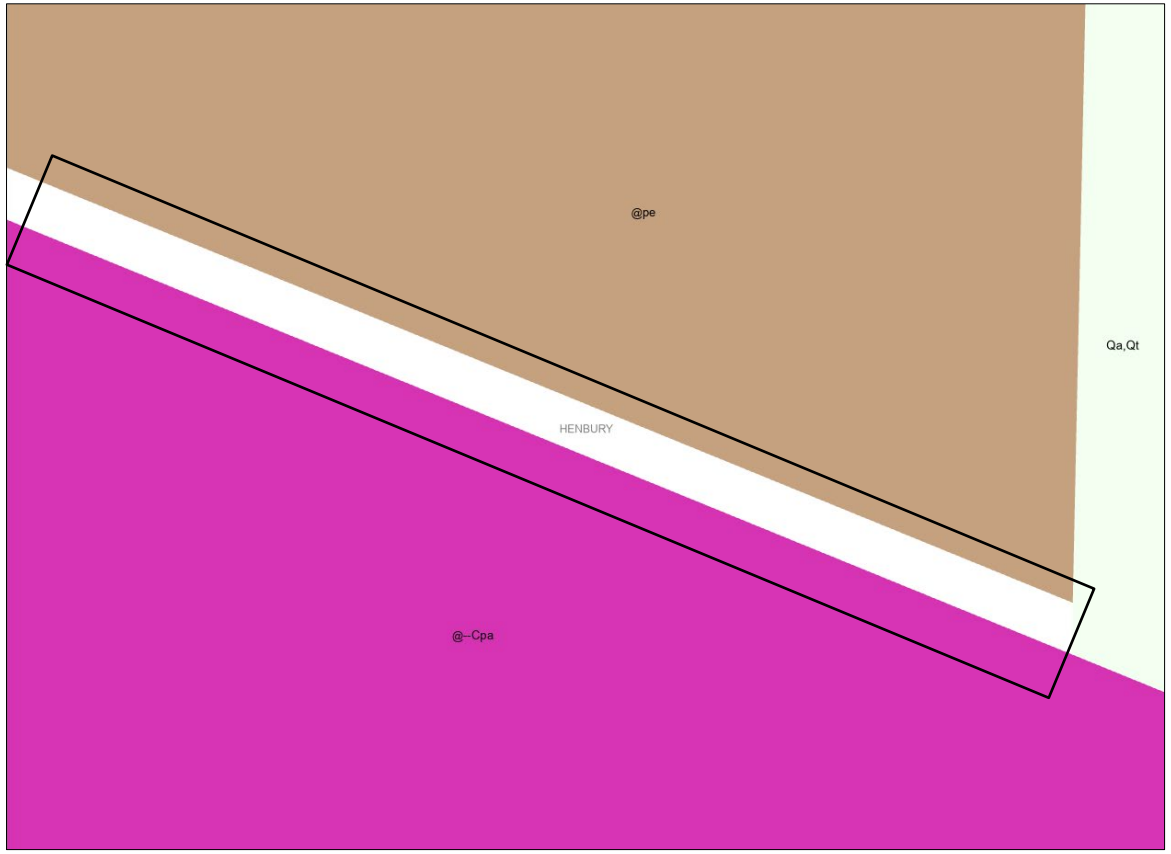


The Automatic Approach: LoopDataConverter



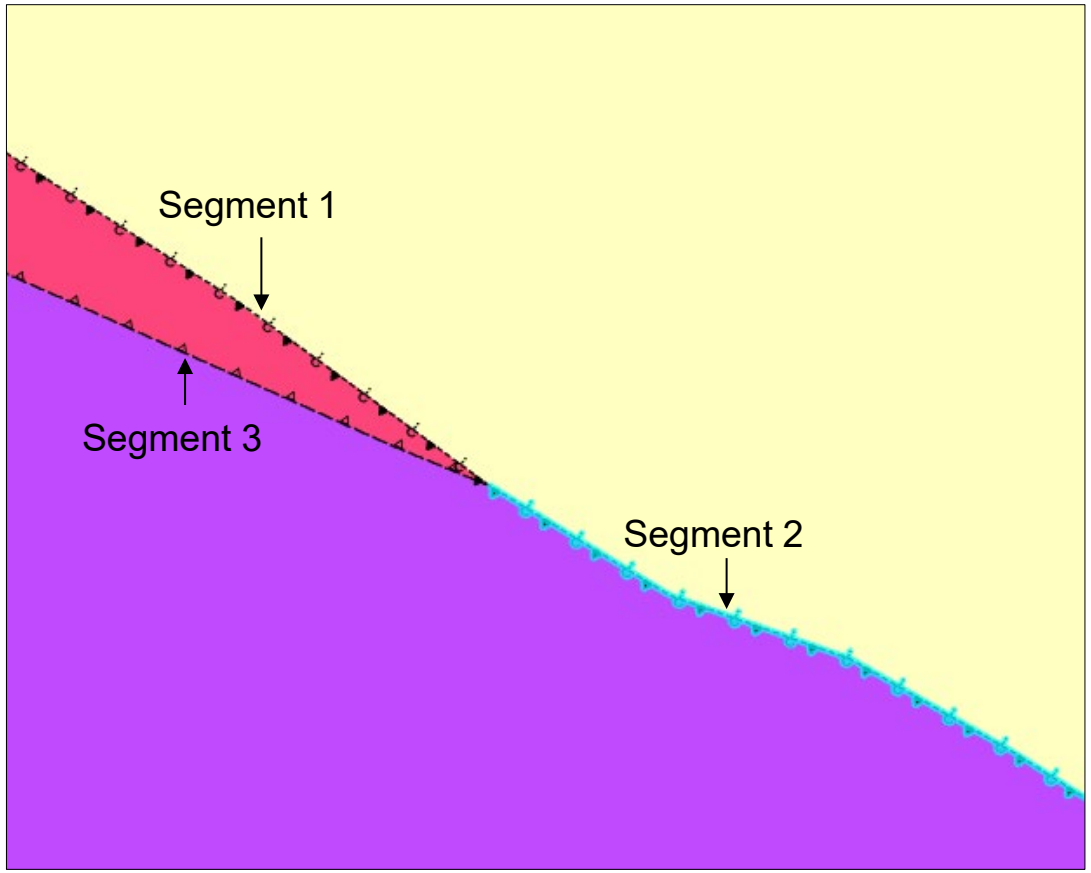
Problems Beyond Format Compatibility

Topology Problems



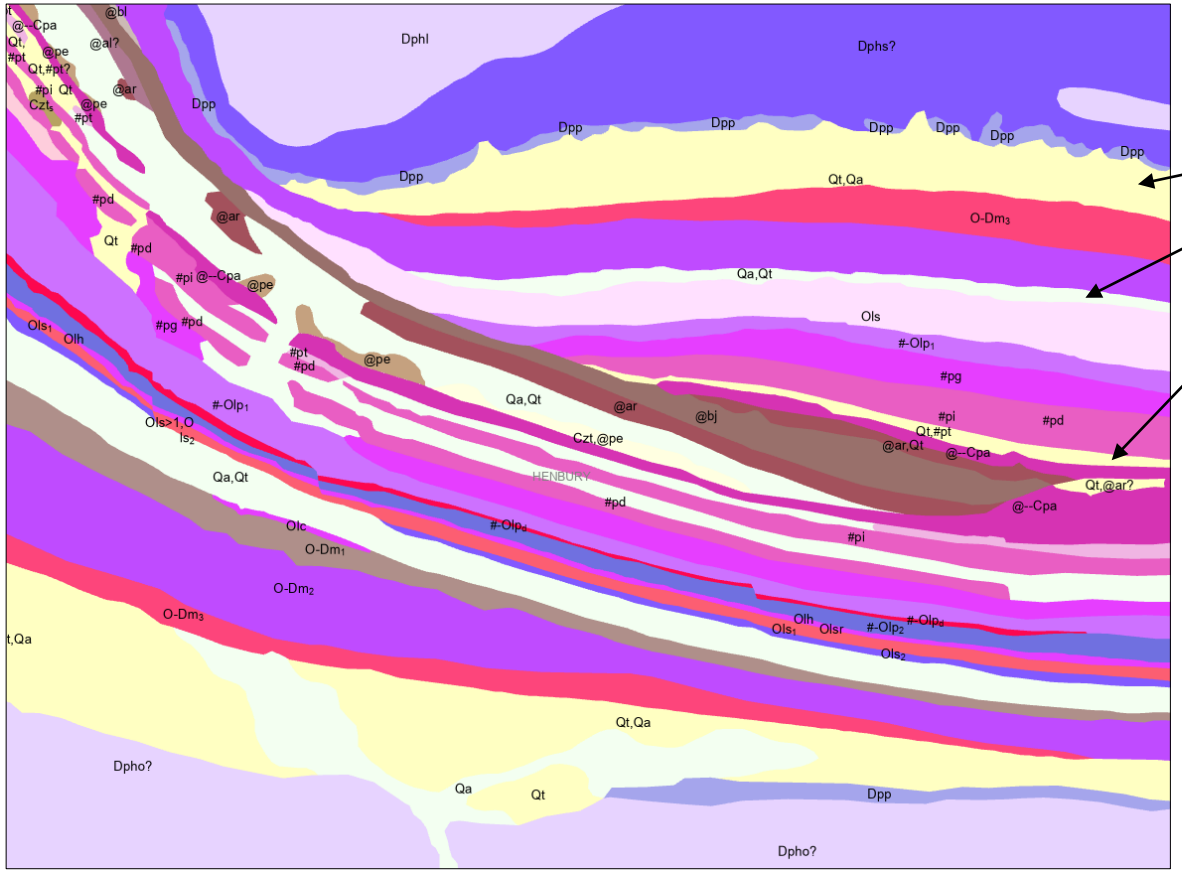
Polygons not aligned: Cannot calculate unit thickness for some units because of missing basal contacts

Fault segmentation



Fault split into several segments: Need to join faults to avoid modelling several faults that form one single fault

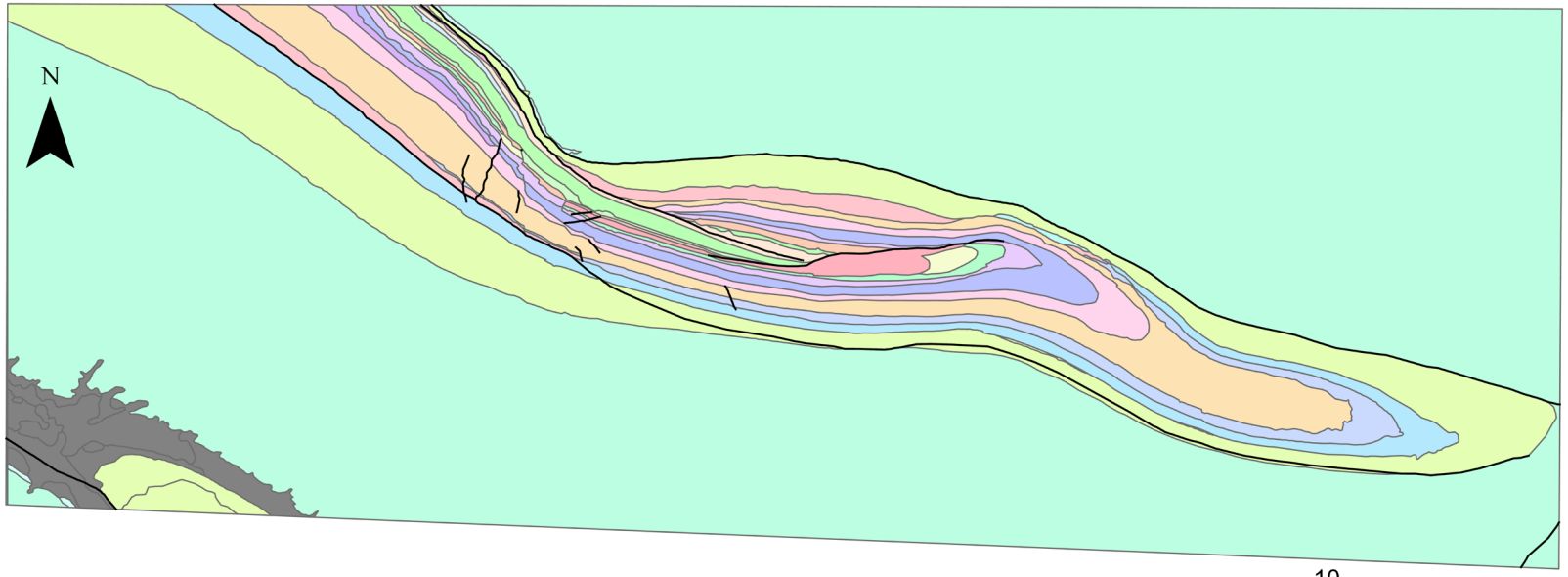
Conformable Cover



Conformable cover to folded units:

- Cannot calculate stratigraphic order
- Need to reinterpret the map

Example of the NE Henbury - Northern Territory



10 Kilometers

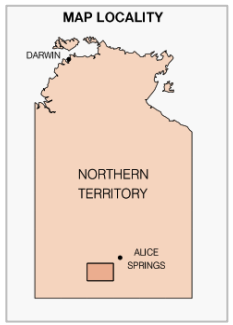
Legend

Faults

NE Henbury Formations

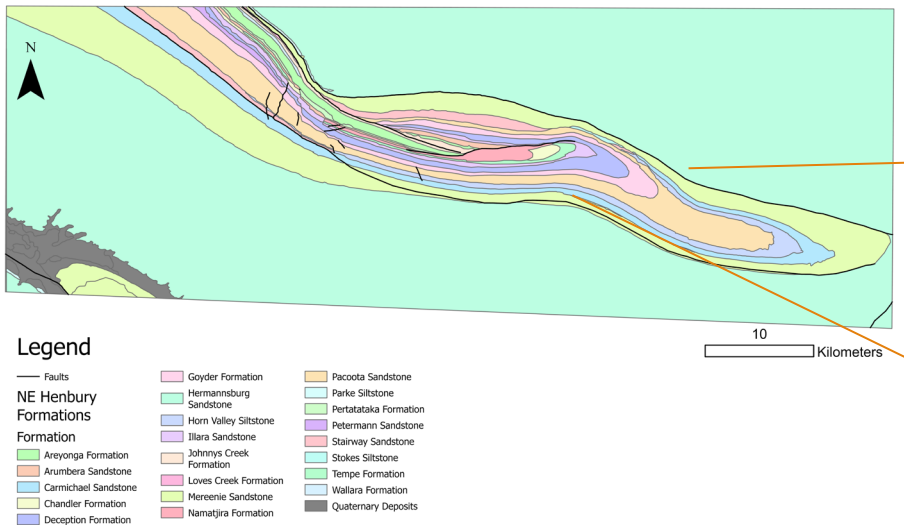
Formation

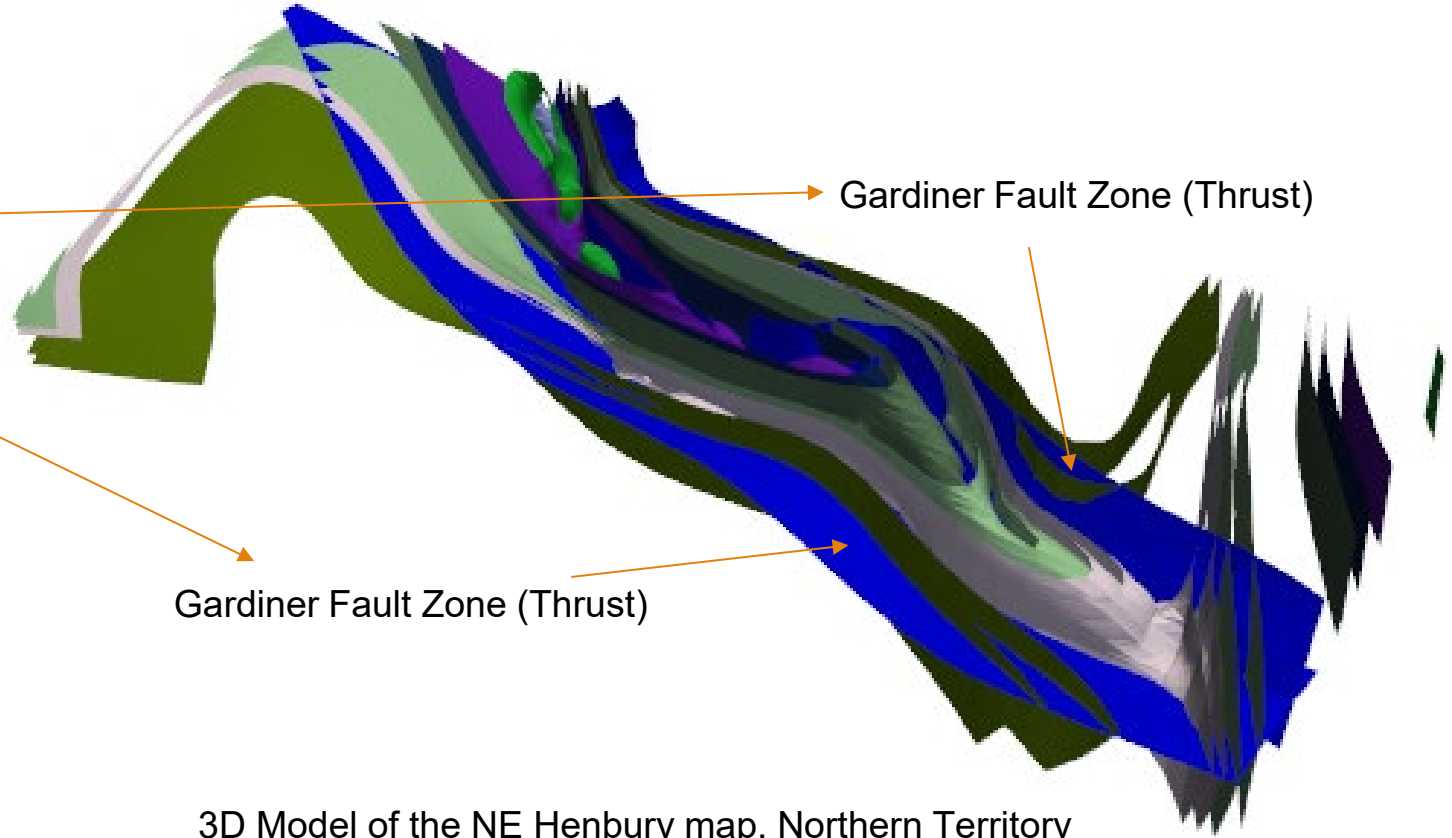
- Areyonga Formation
- Arumbera Sandstone
- Carmichael Sandstone
- Chandler Formation
- Deception Formation
- Goyder Formation
- Hermannsburg Sandstone
- Horn Valley Siltstone
- Illara Sandstone
- Johnnys Creek Formation
- Loves Creek Formation
- Mereenie Sandstone
- Namatjira Formation
- Pacoota Sandstone
- Parke Siltstone
- Pertatataka Formation
- Petermann Sandstone
- Stairway Sandstone
- Stokes Siltstone
- Tempe Formation
- Wallara Formation
- Quaternary Deposits



Northern Territory Geological Survey

Example of the NE Henbury - Northern Territory

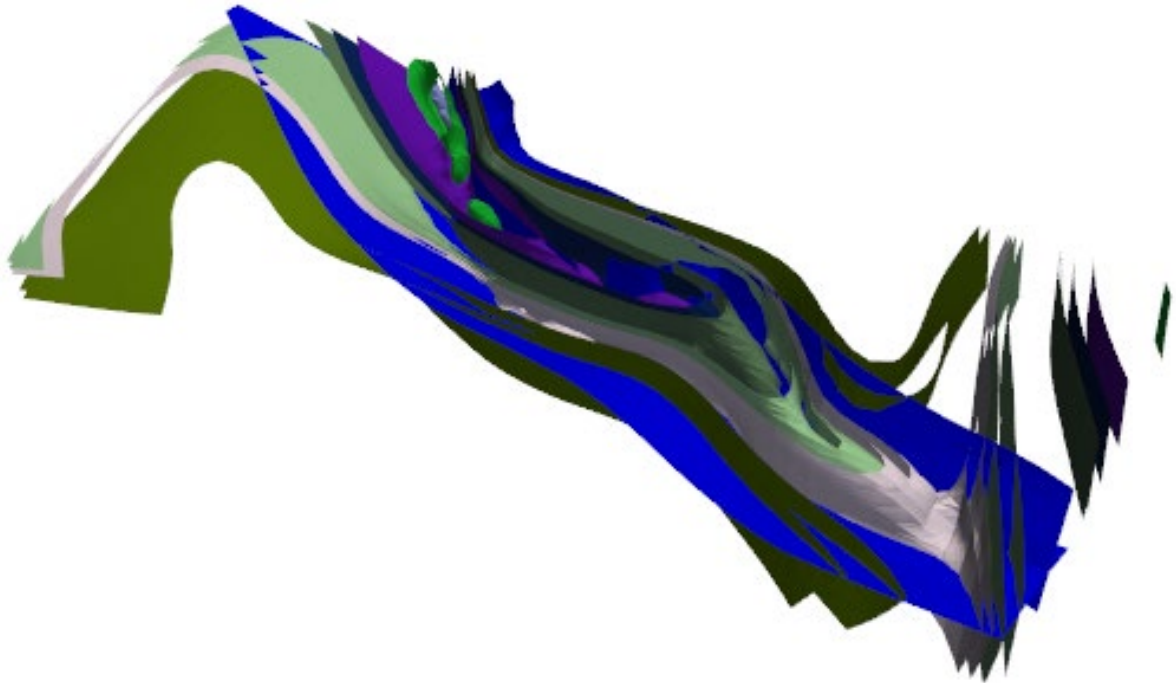




3D Model of the NE Henbury map, Northern Territory

Yet, Unresolved Challenges

1. No Axial surface data > Unconstrained 3D geometry at depth
2. Gardiner Fault orientation is unconstrained
3. Faults without data are assumed to be vertical



Loop

ONE Geology — Providing geoscience data globally

Loopers? Who are we?

Recommendations

1. Provide as many axial surface orientations estimations as possible

2. At least provide an estimate of fault dip

3. Keep faults as one line segment