Avalanche Simulation Data – Handover Notes

This document describes the avalanche simulation data prepared for the **pilot Brenner dataset**,
focusing on the `/11_avaDirectory` directory and the scenario-specific exports in `/12_avaScenMaps`.

`/11_avaDirectory/`

This folder contains the **full avalanche inventory** (~26k features = ~13k avalanches + ~13k release areas).

- **Result rasters**
  - ~6 raster products per avalanche run (e.g. `zDelta`, `travelLengthMax`, `travelAngleMax`, …).
  - Stored in `com4_*` subfolders.
- **avaDirectoryType.***
  - Base directory files: geometry + attributes, but **no raster paths**.
  - Formats: `.csv`, `.geojson`, `.parquet`.
  - Use as the starting point for enrichment.
- **avaDirectoryResults.***
  - Enriched directory files: geometry + attributes + **relative raster paths**.
  - Formats: `.csv`, `.geojson`, `.parquet`.
  - These are the **main input** for scenario filtering and WebGIS.

`/12_avaScenMaps/`

This folder contains **scenario-specific exports**, generated after applying filters
(area IDs, sector, flow type, elevation bands, etc.):

- **avaScen_.parquet**
  - Filtered scenario, geometry + attributes + raster paths.
  - Fast and compact for backend processing.
- **avaScen_.geojson**
  - Same as above, but WebGIS-ready.
  - Includes geometry, attributes, and relative raster paths (`path_*`).
- **avaScenMaster.***
  - Optional combined export of **all filtered scenarios** in one file.
  - Written if `makeMaster=True` during filtering.

Preprocessing Pipeline

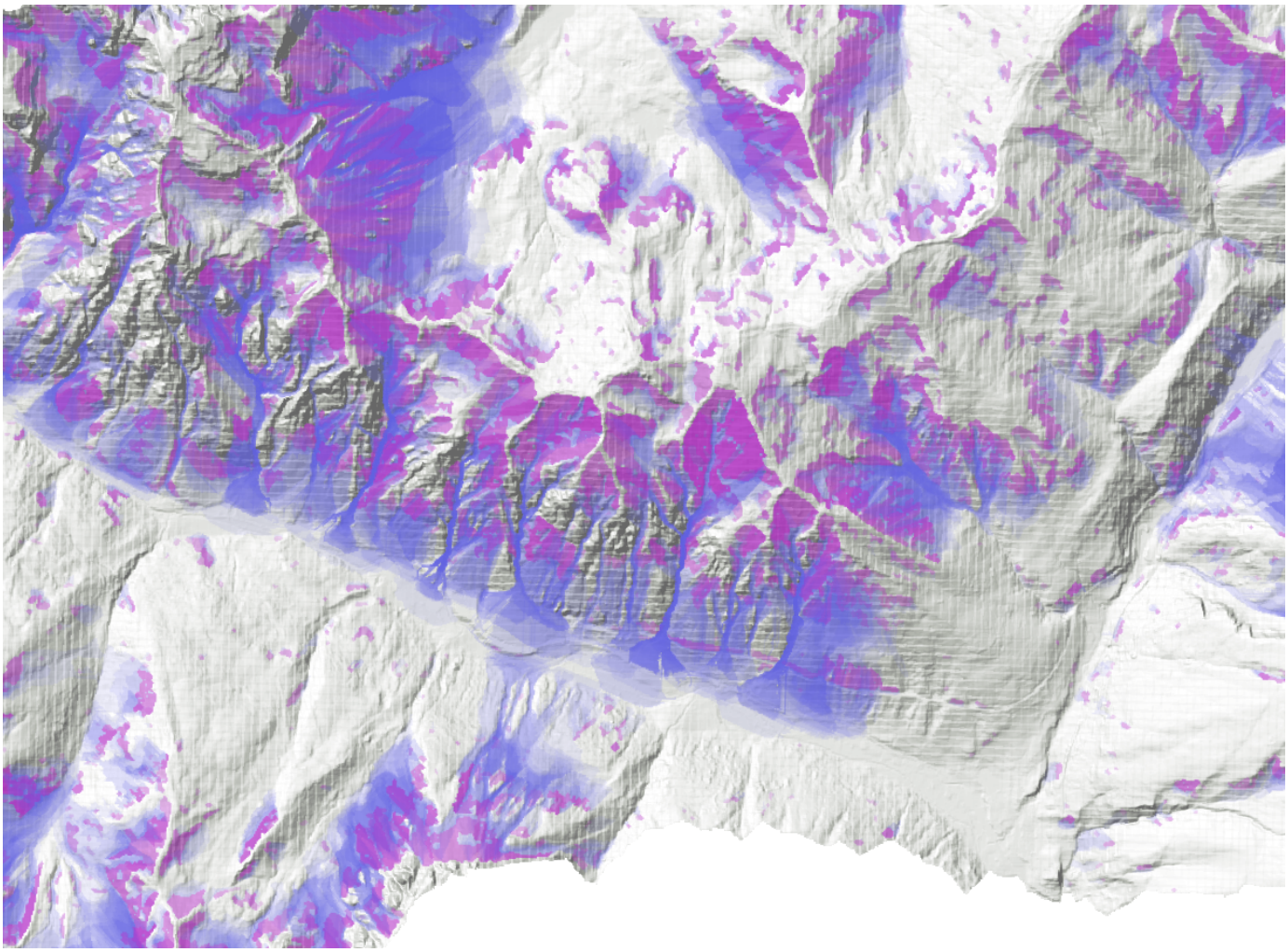
```
avaDirectoryType.*          (geometry + attributes, no paths)
       |
       ▼
 buildFileIndex             (scan com4_* rasters)
       |
       ▼
avaDirectoryResults.*       (geometry + attributes + raster paths)
       |
       ▼
 apply scenario filters     (area IDs, subC, sector, flow, elevation)
       |
       ▼
```

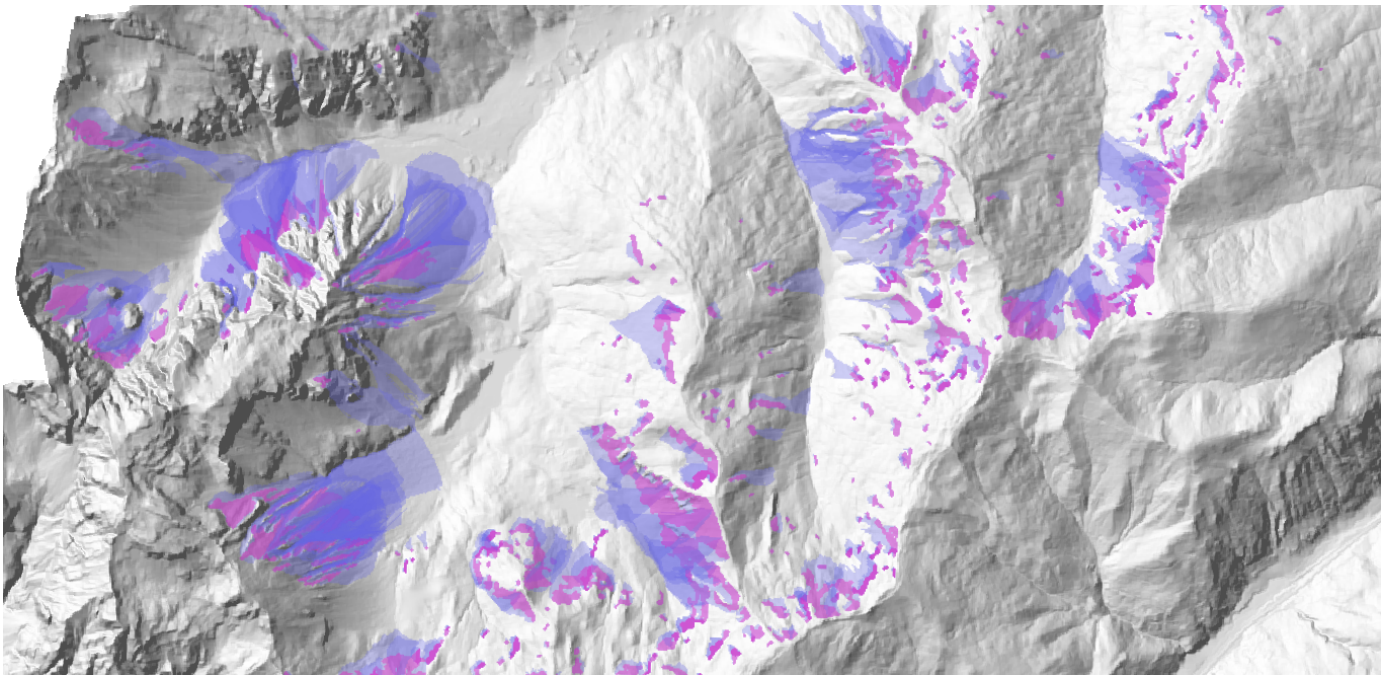
```
avaScen_<name>.parquet/geojson   (per-scenario outputs)
        │
        ▼
avaScenMaster.parquet/geojson    (optional combined export)
```

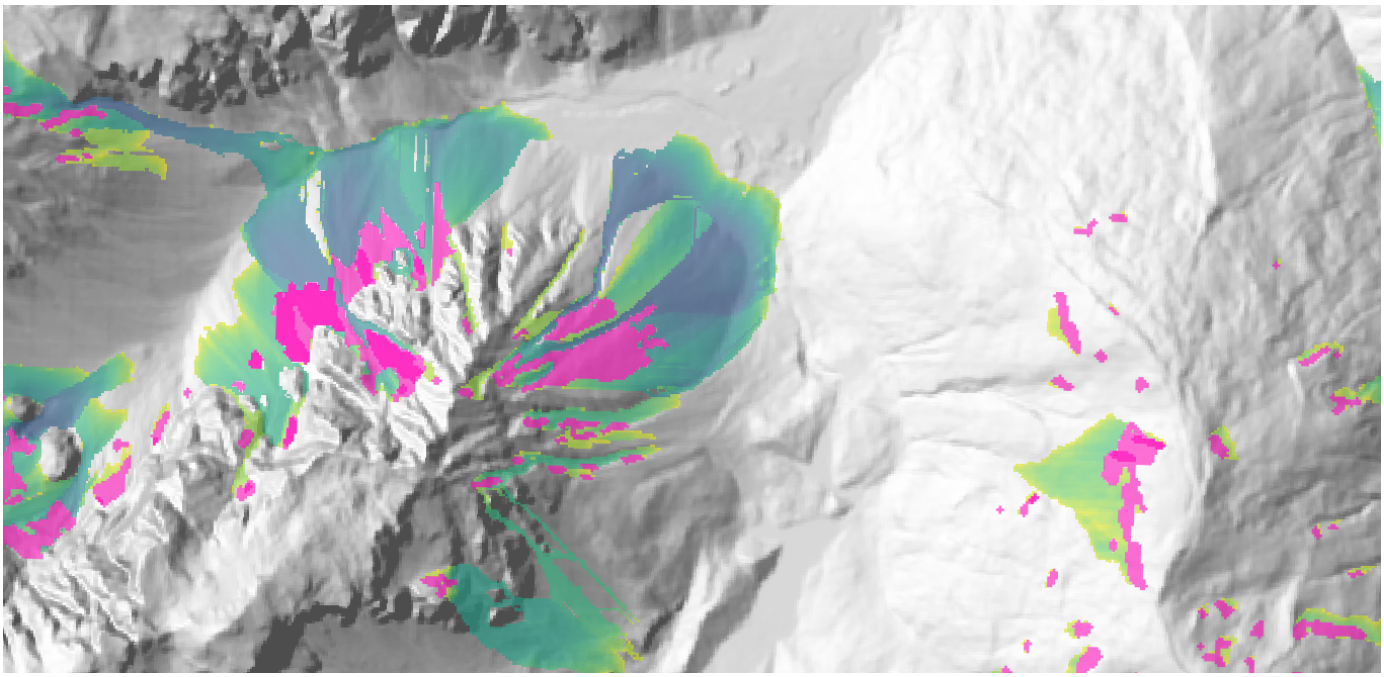
Suggested WebGIS Workflow

1. **Filtering pipeline**
   - Apply scenario filters first on **avaDirectory.csv** (fast).
   - Once filtered avalanches are selected, merge back with **avaDirectory.parquet** to attach geometry.
   - Add raster paths from the raster index (`indexAvaFiles.pkl`).
   - Export a **final GeoJSON** with geometry + relative raster paths
     → already prepared in `/12_avaScenMaps/`.

2. **Display concept**
   - **Zoomed out** → show only **polygons**
     - avalanche outlines [blue], release areas [pink], see 1&2 screenshot below.
   - **Zoomed in** (after a threshold) → load the linked **TIFF rasters on demand** from the `path_*` fields in the scenario GeoJSON.
     - avalanche raster [intensity], release areas [pink], see 3 screenshot below.
   - This keeps the map lightweight while enabling rich raster detail when needed.







Applied Filters for Testing

Scenario 1 – Brenner South

```
areaLwdIds = ['IT-32-BZ-04-01', 'IT-32-BZ-05-01']
subCs      = [500]
sectors    = ["S", "E"]
flows      = ["Dry"]
elevMin    = 0
elevMax    = 2000
```

Output:

- AREA 1 | Scenario 1 → 12_avaScenMaps/avaScen_BrennerSued.parquet / .geojson
- (per-area exports also available if makeMaster=False)

Scenario 2 – Brenner North

```
areaLwdIds = ['AT-07-22', 'AT-07-23-02']
subCs      = [500]
sectors    = ["N", "W"]
flows      = ["Dry"]
elevMin    = 1800
elevMax    = 2400
```

Output:

- AREA 2 | Scenario 2 → 12_avaScenMaps/avaScen_BrennerNord.parquet / .geojson
- (per-area exports also available if makeMaster=False)

Summary Table Scenario Area IDs SubC Sectors Flows Elevation Range Output Files Brenner South IT-32-BZ-04-01, IT-32-BZ-05-01 500 S, E Dry 0 – 2000 m avaScen_BrennerSued.parquet / .geojson Brenner North AT-07-22, AT-07-23-02 500 N, W Dry 1800 – 2400 m avaScen_BrennerNord.parquet / .geojson

Summary Table (when `makeMaster = False`)

Scenario	Area IDs	SubC	Sectors	Flows	Elevation Range	Output Files
Brenner South	IT-32-BZ-04-01, IT-32-BZ-05-01	500	S, E	Dry	0 – 2000 m	avaScen_BrennerSued.parquet / .geojson
Brenner North	AT-07-22, AT-07-23-02	500	N, W	Dry	1800 – 2400 m	avaScen_BrennerNord.parquet / .geojson