analysis2

June 2, 2021

1 Application of the fixed window method on the PARADIM-2

```
%run -i ../tomography/utils.py
%run -i startup2.py
```

```
WARNING:silx.opencl.common:The module pyOpenCL has been imported but can't be
used here
```

```
Namespace: ['AzimuthalIntegrator', 'In', 'Out', 'ProgressBar', 'annotate_peaks',
'assign_Q_to_atlas', 'create_atlas', 'create_atlas_dask', 'create_dataset',
'dask', 'dataclasses', 'db_ana', 'db_csv', 'db_raw', 'df_uid', 'exit',
'get_ipython', 'get_vlim', 'mpl', 'np', 'pd', 'pixel_to_Q', 'plot_grain_maps',
'plot_real_aspect', 'plt', 'quit', 'reshape', 'reshape_to_matrix',
'set_real_aspect', 'tp', 'typing', 'xr']
```

1.1 The methods to get grain maps

They are all based on the extracted peak positions from `trackpy`.

1.1.1 The fill-in method (pseudo code)

```
map = an empty image

# peak i has intensities[i] on frame_index[i]
intensities = a list of intensity of the peak
frame_index = a list of index of frame

for index, intensity in zip(frame_index, intensities):
    position = get_position_on_map(index)
    map[position] = intensity
```

1.1.2 The fixed window method (pseudo code)

```
frames = a series of diffraction image

center_pixel = the center pixel of the peak
```

```
width = the width of the peak
window = create_window(center_pixel, width)

map = an empty image
for index, frame in enumerate(frames):
    intensity = average(frame[window])
    position = get_position_on_map(index)
    map[position] = intensity
```

1.2 Apply the method using dask

1.3 Visualize the results

Visualize the results from the fixed window method and compare it with the filled in trackpy result.

```
# fixed window method
atlas1 = xr.load_dataset("data/fixed_window_method_example.nc")
atlas1 = atlas1.sortby(["x", "y"])
```

```
# the largest 10 Bragg peaks from PARADIM-2
tracks = db_csv.get_df("60b691d84523929818fb267d")
atlas2 = create_atlas(tracks)
atlas2 = atlas2.sortby(["x", "y"])
```

The (average) positions of the peaks on the images

```
atlas1[["x", "y"]].to_dataframe()
```

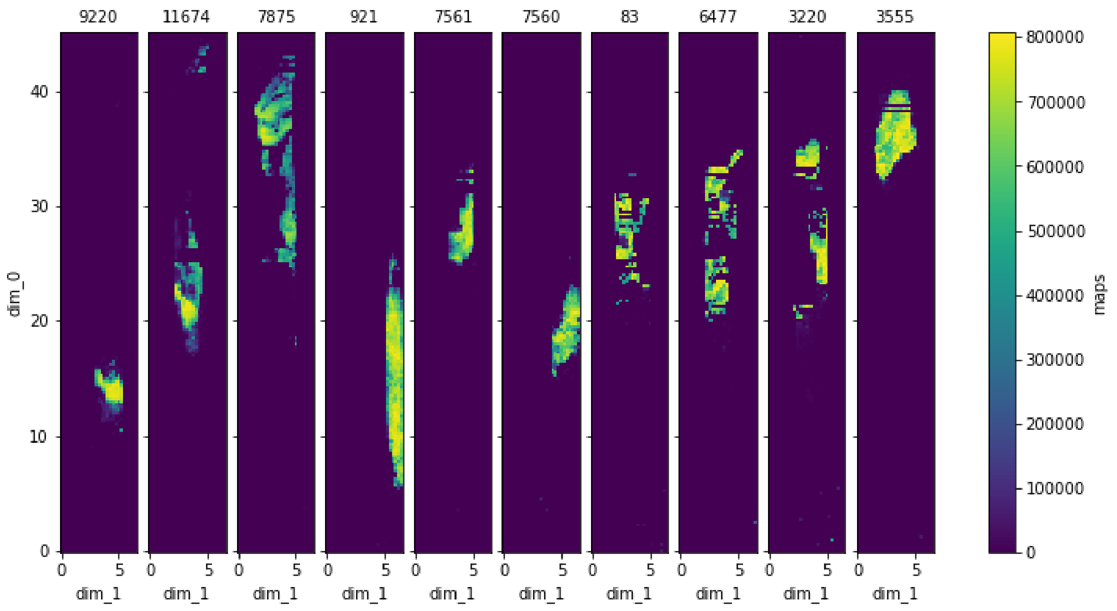
[8]:

```
          x     y
grain
9220     97  1632
11674   111  1623
7875    114  1619
921     546  3211
7561    696  3207
7560    987  3703
83     1445  3363
6477   1447  3363
3220   1451  3363
3555   1895  2737
```

1.3.1 Fill-in method

The grain maps labeled by grain ID.

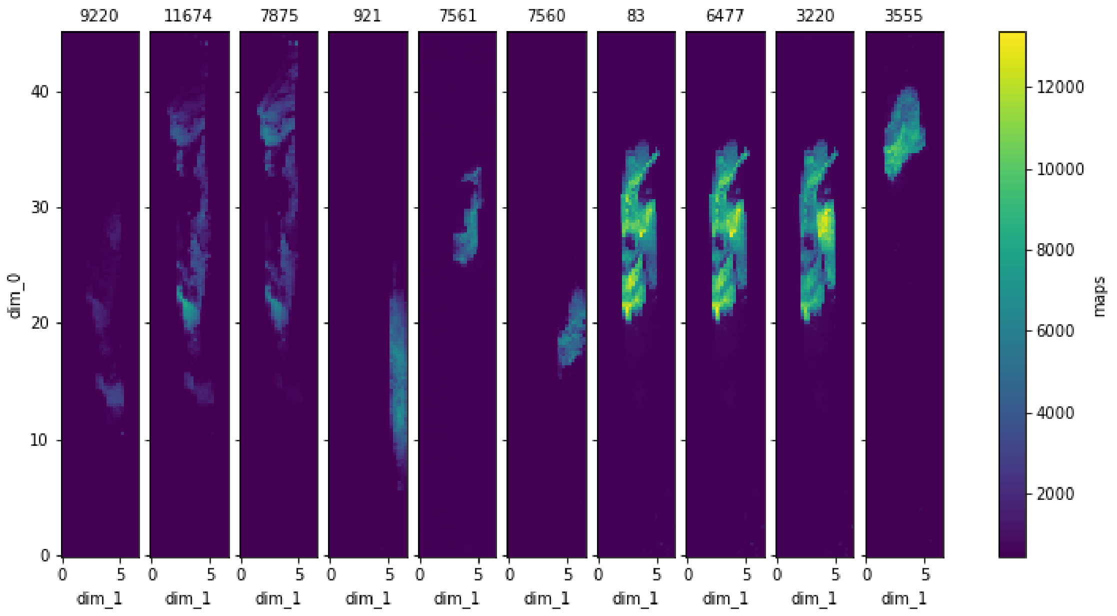
```
facet2 = plot_grain_maps(atlas2)
```



1.3.2 Fixed window method

The grain maps labeled by grain ID.

```
facet1 = plot_grain_maps(atlas1)
```


dim_0
dim_1
maps