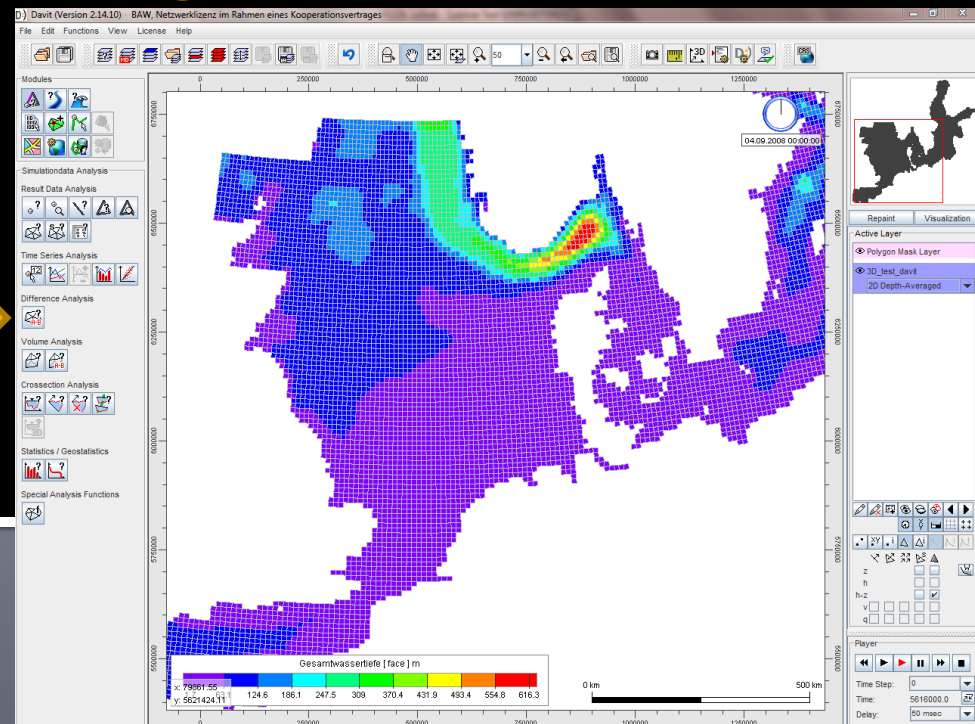
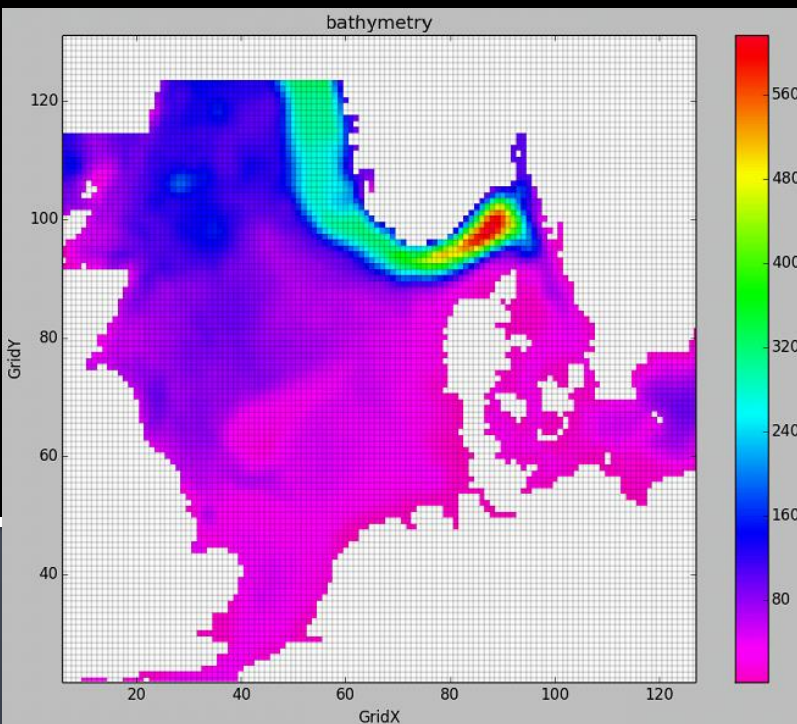


convert2ugrid: MOSSCO structured grid NetCDF → DAVIT unstructured grid NetCDF



Nikolai Chernikov

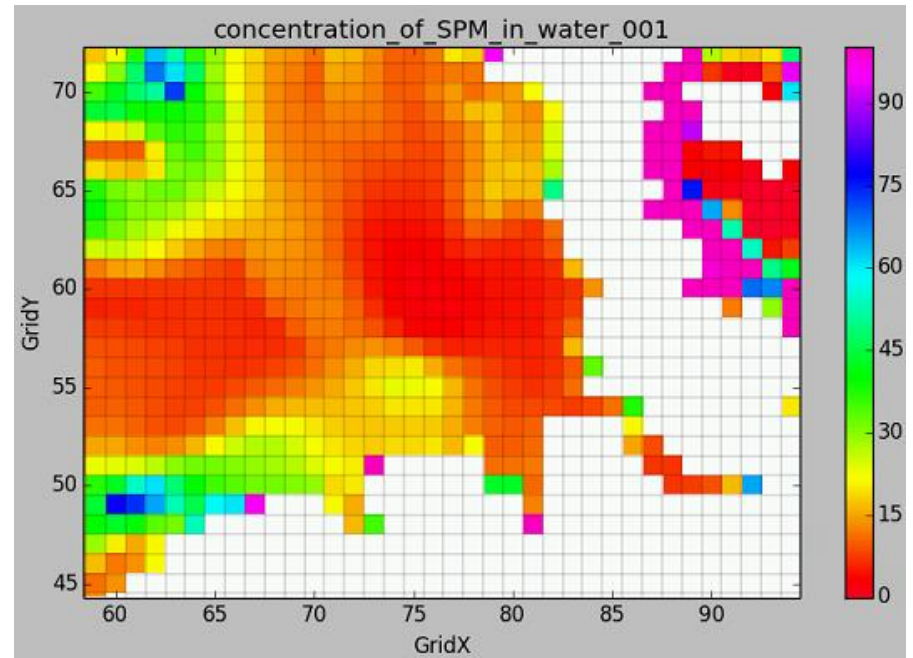
MOSSCO output

Grid:

- Structured
- Rectangular
- Uniform
- Sigma z-layers
- Values at cell-center

■ Example of variable:

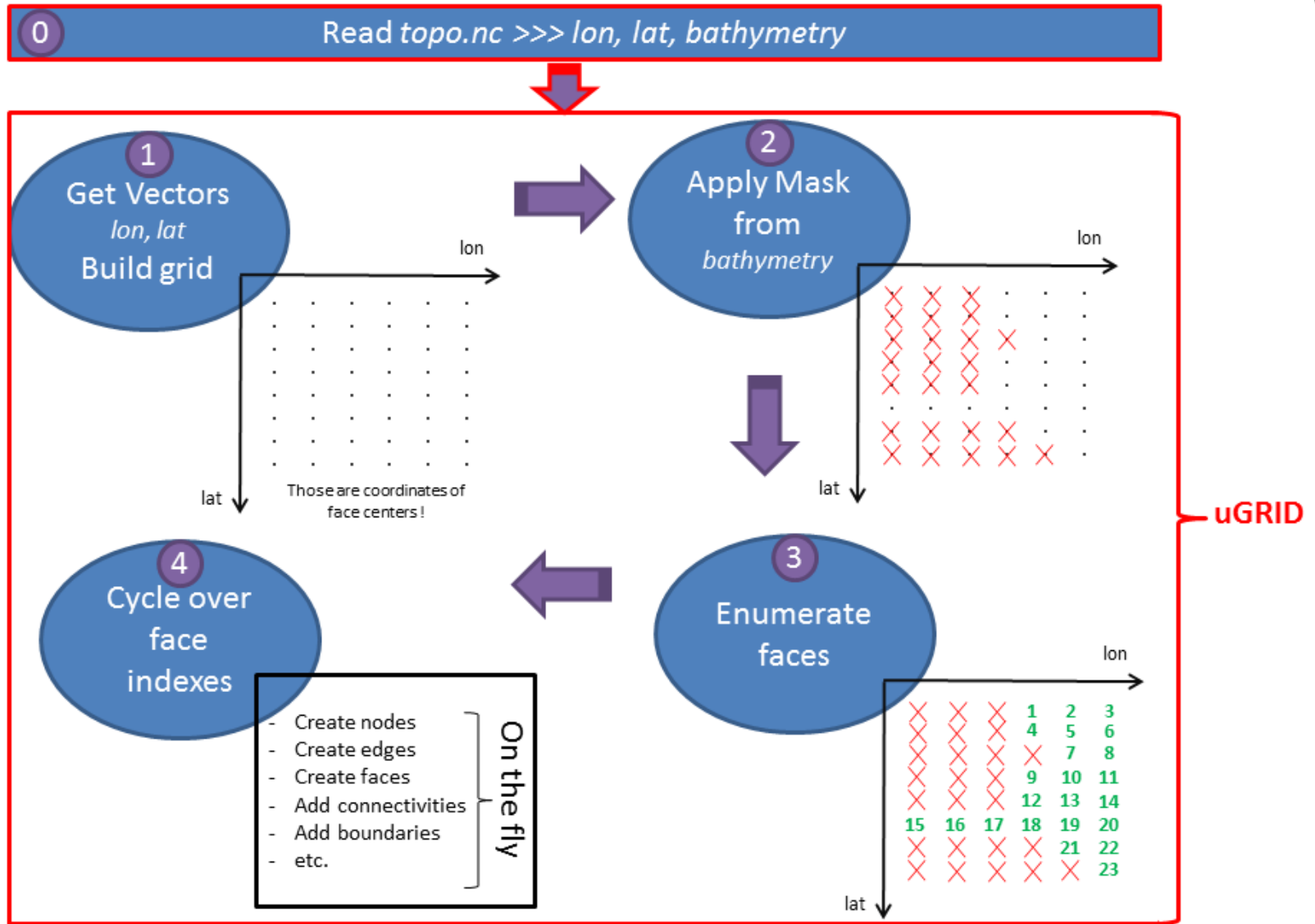
`double c_spm_001(time, z, y, x)`



Splitting jobs

- (1) Generate UGRID, map data
- (2) Rename vars, add proper attributes
- (3) Save in NetCDF file

1. Generate UGRID, map data



2. Rename vars, add attributes

mossc

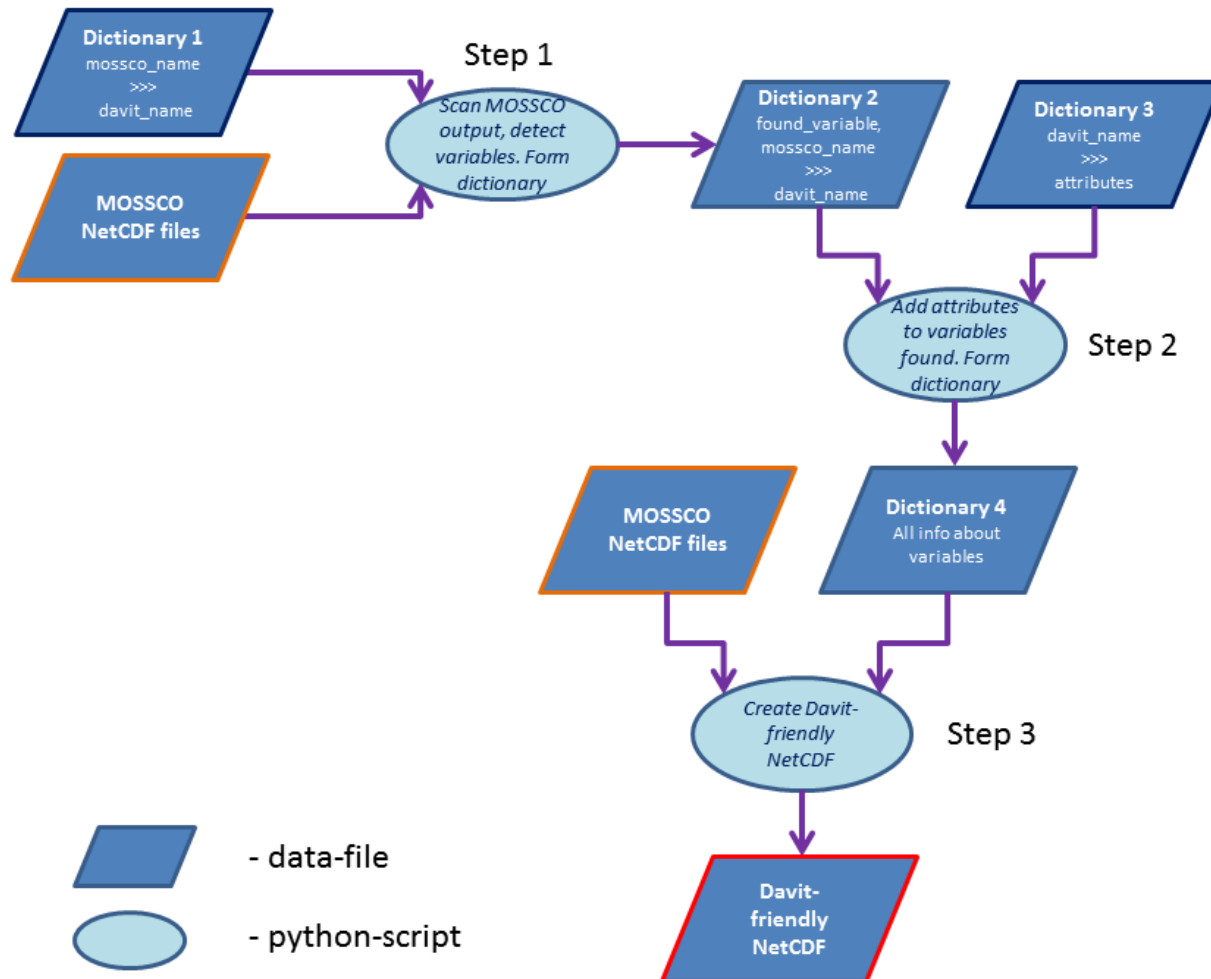
```
double temperature_in_water (time, getmGrid3D_getm_3, getmGrid3D_getm_2, getmGrid3D_getm_1) ;  
    temperature_in_water: standard_name = "temperature_in_water" ;  
    temperature_in_water: long_name = "temperature_in_water" ;  
    temperature_in_water: _FillValue = -1.e+30 ;  
    temperature_in_water: coordinates = "getmGrid3D_getm_z getmGrid3D_getm_y getmGrid3D_getm_x" ;  
    temperature_in_water: units = "degC" ;  
    temperature_in_water: creator = "getm" ;  
    temperature_in_water: missing_value = -1.e+30 ;
```

?

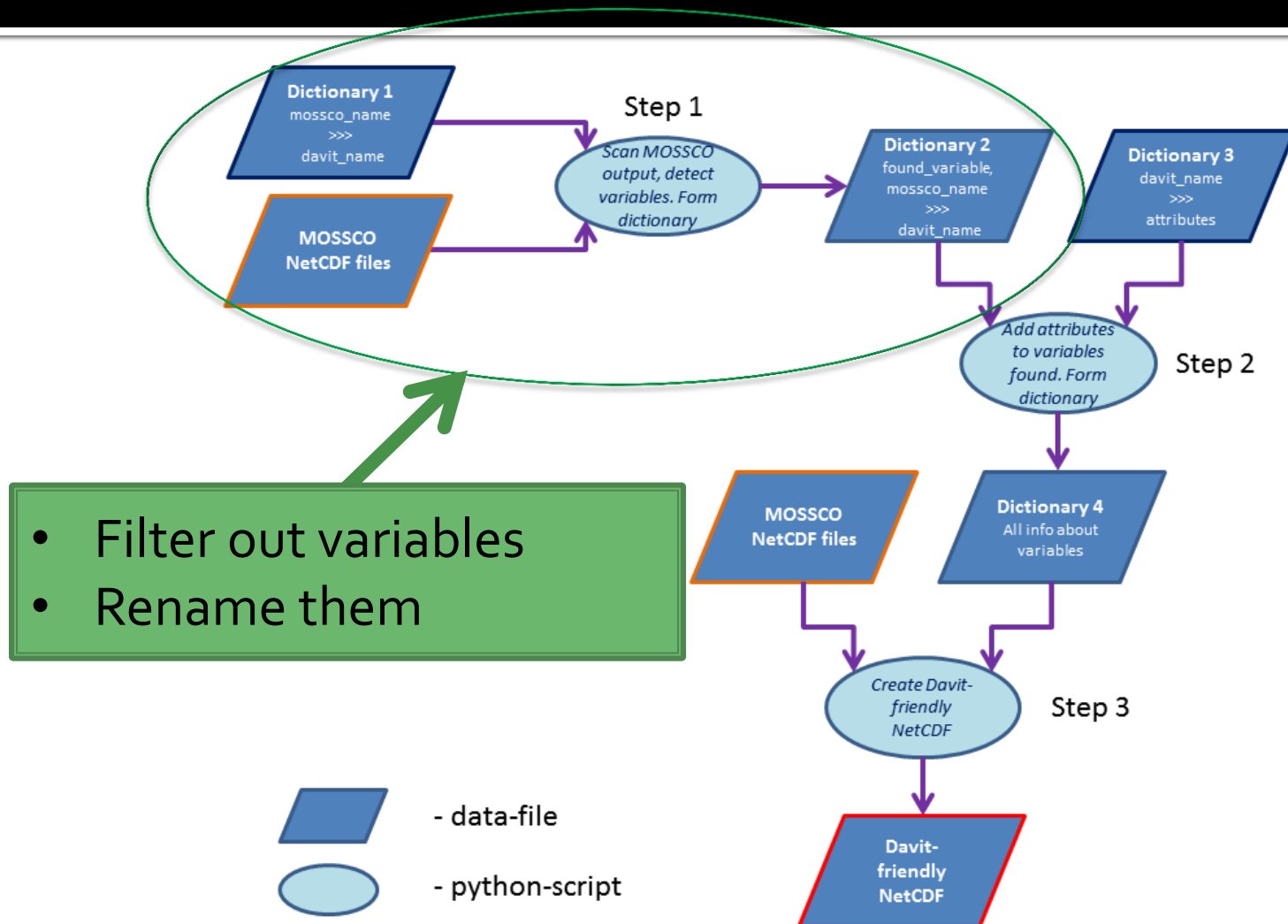
davit

```
float Mesh2_face_Temperatur_3d (nMesh2_data_time, nMesh2_layer_3d, nMesh2_face) ;  
    Mesh2_face_Temperatur_3d: standard_name = "temperature_in_water" ;  
    Mesh2_face_Temperatur_3d: long_name = "Temperatur, Face (Polygon)" ;  
    Mesh2_face_Temperatur_3d: _FillValue = 1.e+31f ;  
    Mesh2_face_Temperatur_3d: coordinates = "Mesh2_face_x Mesh2_face_y Mesh2_face_lon Mesh2_face_lat Mesh2_face_z_face_3d" ;  
    Mesh2_face_Temperatur_3d: units = "degC" ;  
    Mesh2_face_Temperatur_3d: grid_mapping = "Mesh2_crs" ;  
    Mesh2_face_Temperatur_3d: cell_measures = "area: Mesh2_face_wet_area" ;  
    Mesh2_face_Temperatur_3d: cell_methods = "nMesh2_data_time: point nMesh2_layer_3d: mean area: point" ;  
    Mesh2_face_Temperatur_3d: name_id = 6 ;  
    Mesh2_face_Temperatur_3d: location = "face" ;  
    Mesh2_face_Temperatur_3d: mesh = "Mesh2" ;
```

2. Rename vars, add attributes



2. Rename vars, add attributes



2.Example of “Dictionary 1”

MOSSCO

>>> DAVIT

'depth_averaged_x_velocity_in_water'
'depth_averaged_y_velocity_in_water'
'temperature_in_water'
'bathymetry'

>>> 'Mesh2_face_Stroemungsgeschwindigkeit_x_2d'
>>> 'Mesh2_face_Stroemungsgeschwindigkeit_y_2d'
>>> 'Mesh2_face_Temperatur_3d'
>>> 'Mesh2_face_depth_2d'

2.Example of “Dictionary 2”

```
"\\widar\home\mosscoco.nc", "Effect_of_Mbalthica_on_critical_bed_shearstress"  
"\\widar\home\mosscoco.nc", "Effect_of_Mbalthica_on_sediment_erodibility"  
"\\widar\home\mosscoco.nc", "temperature_in_water"
```

```
>>> NOT_INCLUDED
```

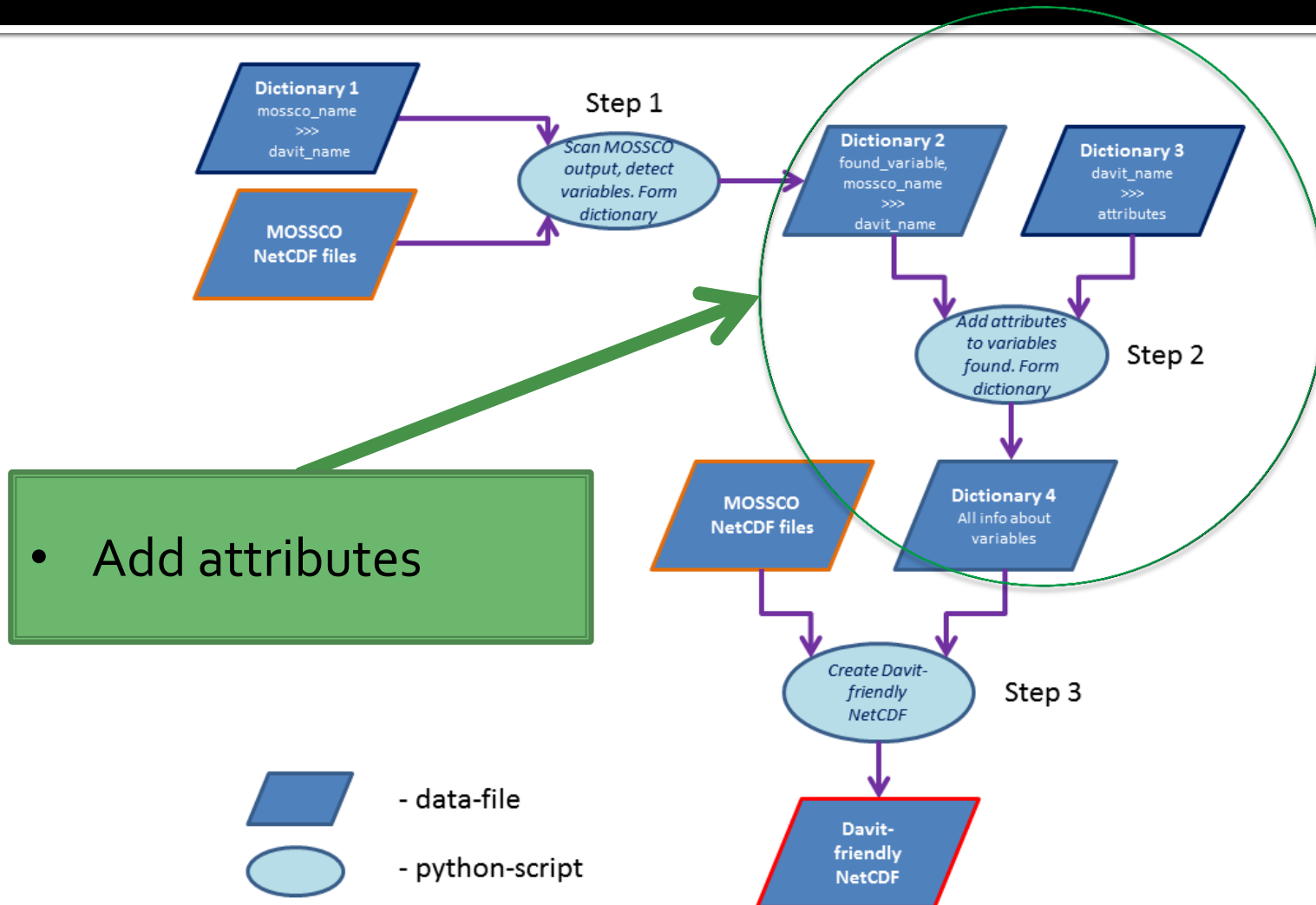
```
>>> NOT_INCLUDED
```

```
>>> "Mesh2_face_Temperatur_3d"
```

```
"\\widar\home\topo.nc", "bathymetry"
```

```
>>> "Mesh2_face_depth_2d"
```

2. Rename vars, add attributes



2.Example of “Dictionary 3”

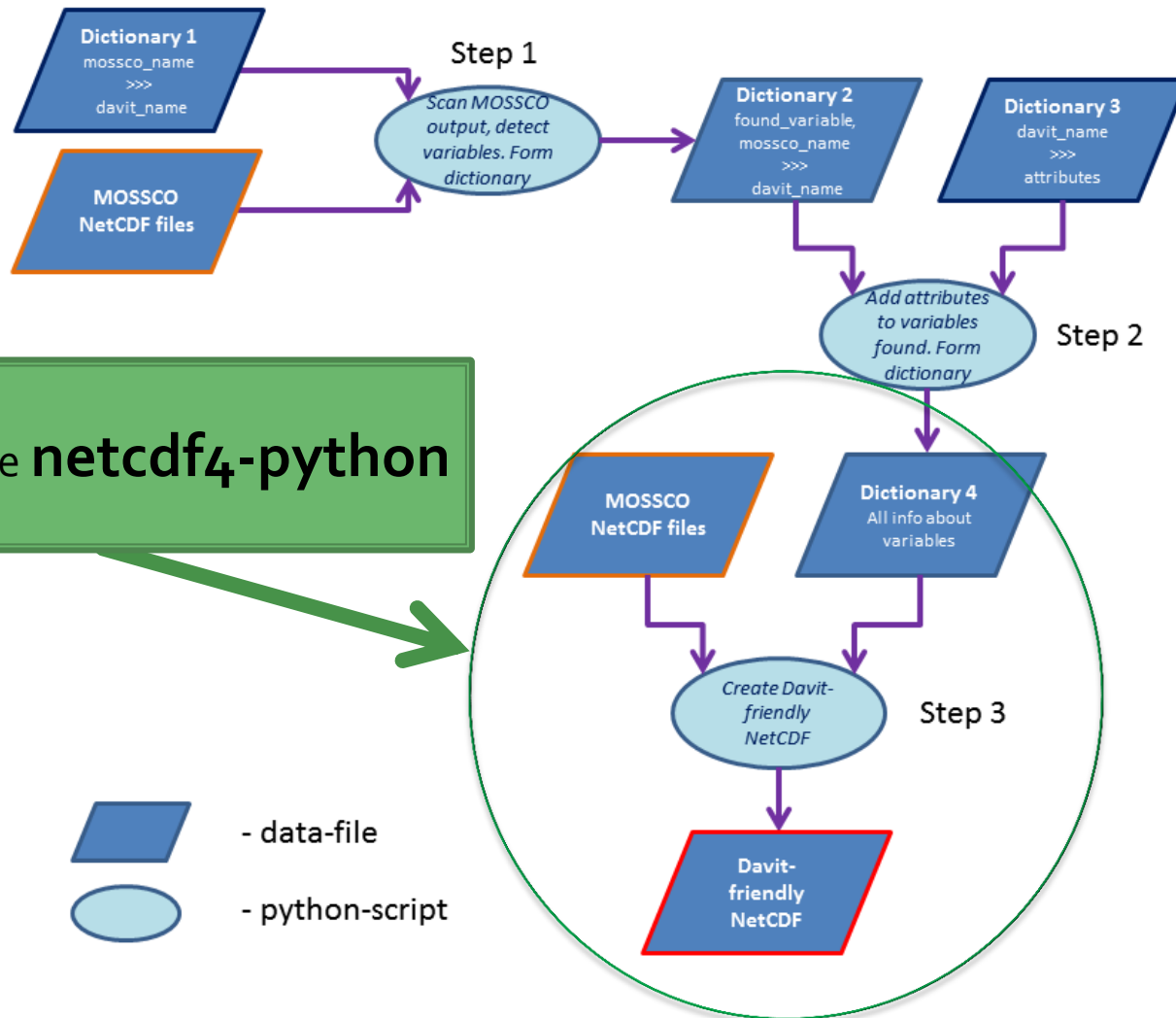
```
float Mesh2_face_Temperatur_3d( nMesh2_data_time, nMesh2_layer_3d, nMesh2_face) ;  
    Mesh2_face_Temperatur_3d: long_name = "Temperatur, Face (Polygon)" ;  
    Mesh2_face_Temperatur_3d: units = "degC" ;  
    Mesh2_face_Temperatur_3d: name_id = 6 ;  
    Mesh2_face_Temperatur_3d: _FillValue = 1.e+31f ;  
    Mesh2_face_Temperatur_3d: cell_measures = "area: Mesh2_face_wet_area" ;  
    Mesh2_face_Temperatur_3d: cell_methods = "nMesh2_data_time: point nMesh2_layer_3d: mean area: point" ;  
    Mesh2_face_Temperatur_3d: coordinates = "Mesh2_face_x Mesh2_face_y Mesh2_face_lon Mesh2_face_lat Mesh2_face_z_face_3d" ;  
    Mesh2_face_Temperatur_3d: grid_mapping = "Mesh2_crs" ;  
    Mesh2_face_Temperatur_3d: standard_name = "temperature" ;  
    Mesh2_face_Temperatur_3d: mesh = "Mesh2" ;  
    Mesh2_face_Temperatur_3d: location = "face" ;  
  
double Mesh2_face_depth_2d( nMesh2_time, nMesh2_face) ;  
    Mesh2_face_depth_2d: long_name = "Topographie" ;  
    Mesh2_face_depth_2d: units = "m" ;  
    Mesh2_face_depth_2d: name_id = 17 ;  
    Mesh2_face_depth_2d: _FillValue = 1.e+31 ;  
    Mesh2_face_depth_2d: cell_measures = "area: Mesh2_face_area" ;  
    Mesh2_face_depth_2d: cell_methods = "nMesh2_time: mean area: mean" ;  
    Mesh2_face_depth_2d: coordinates = "Mesh2_face_x Mesh2_face_y Mesh2_face_lon Mesh2_face_lat" ;  
    Mesh2_face_depth_2d: grid_mapping = "Mesh2_crs" ;  
    Mesh2_face_depth_2d: standard_name = "sea_floor_depth_below_geoid" ;  
    Mesh2_face_depth_2d: mesh = "Mesh2" ;  
    Mesh2_face_depth_2d: location = "face" ;  
    Mesh2_face_depth_2d: davit_role = "visualization_variable" ;
```

2.Example of “Dictionary 4”

```
float Mesh2_face_Temperatur_3d( nMesh2_data_time, nMesh2_layer_3d, nMesh2_face) ;
    Mesh2_face_Temperatur_3d: long_name = "Temperatur, Face (Polygon)" ;
    Mesh2_face_Temperatur_3d: units = "degC" ;
    Mesh2_face_Temperatur_3d: name_id = 6 ;
    Mesh2_face_Temperatur_3d: _FillValue = 1.e+31f ;
    Mesh2_face_Temperatur_3d: cell_measures = "area: Mesh2_face_wet_area" ;
    Mesh2_face_Temperatur_3d: cell_methods = "nMesh2_data_time: point nMesh2_layer_3d: mean area: point" ;
    Mesh2_face_Temperatur_3d: coordinates = "Mesh2_face_x Mesh2_face_y Mesh2_face_lon Mesh2_face_lat Mesh2_face_z_face_3d" ;
    Mesh2_face_Temperatur_3d: grid_mapping = "Mesh2_crs" ;
    Mesh2_face_Temperatur_3d: standard_name = "temperature" ;
    Mesh2_face_Temperatur_3d: mesh = "Mesh2" ;
    Mesh2_face_Temperatur_3d: location = "face" ;
    Mesh2_face_Temperatur_3d: _mosSCO_filename = "\\Widar\home\mosSCO.nc" ;
    Mesh2_face_Temperatur_3d: _mosSCO_varname = "temperature_in_water" ;

double Mesh2_face_depth_2d( nMesh2_time, nMesh2_face) ;
    Mesh2_face_depth_2d: long_name = "Topographie" ;
    Mesh2_face_depth_2d: units = "m" ;
    Mesh2_face_depth_2d: name_id = 17 ;
    Mesh2_face_depth_2d: _FillValue = 1.e+31 ;
    Mesh2_face_depth_2d: cell_measures = "area: Mesh2_face_area" ;
    Mesh2_face_depth_2d: cell_methods = "nMesh2_time: mean area: mean" ;
    Mesh2_face_depth_2d: coordinates = "Mesh2_face_x Mesh2_face_y Mesh2_face_lon Mesh2_face_lat" ;
    Mesh2_face_depth_2d: grid_mapping = "Mesh2_crs" ;
    Mesh2_face_depth_2d: standard_name = "sea_floor_depth_below_geoid" ;
    Mesh2_face_depth_2d: mesh = "Mesh2" ;
    Mesh2_face_depth_2d: location = "face" ;
    Mesh2_face_depth_2d: davit_role = "visualization_variable" ;
    Mesh2_face_depth_2d: _mosSCO_filename = "\\Widar\home\topo.nc" ;
    Mesh2_face_depth_2d: _mosSCO_varname = "bathymetry" ;
```

3. Rename vars, add attributes



Outline

- Trailing errors
- Easy editable
- User interaction at any step
- Start from any step
- uGrid conversion-module – can be improved

Challenges

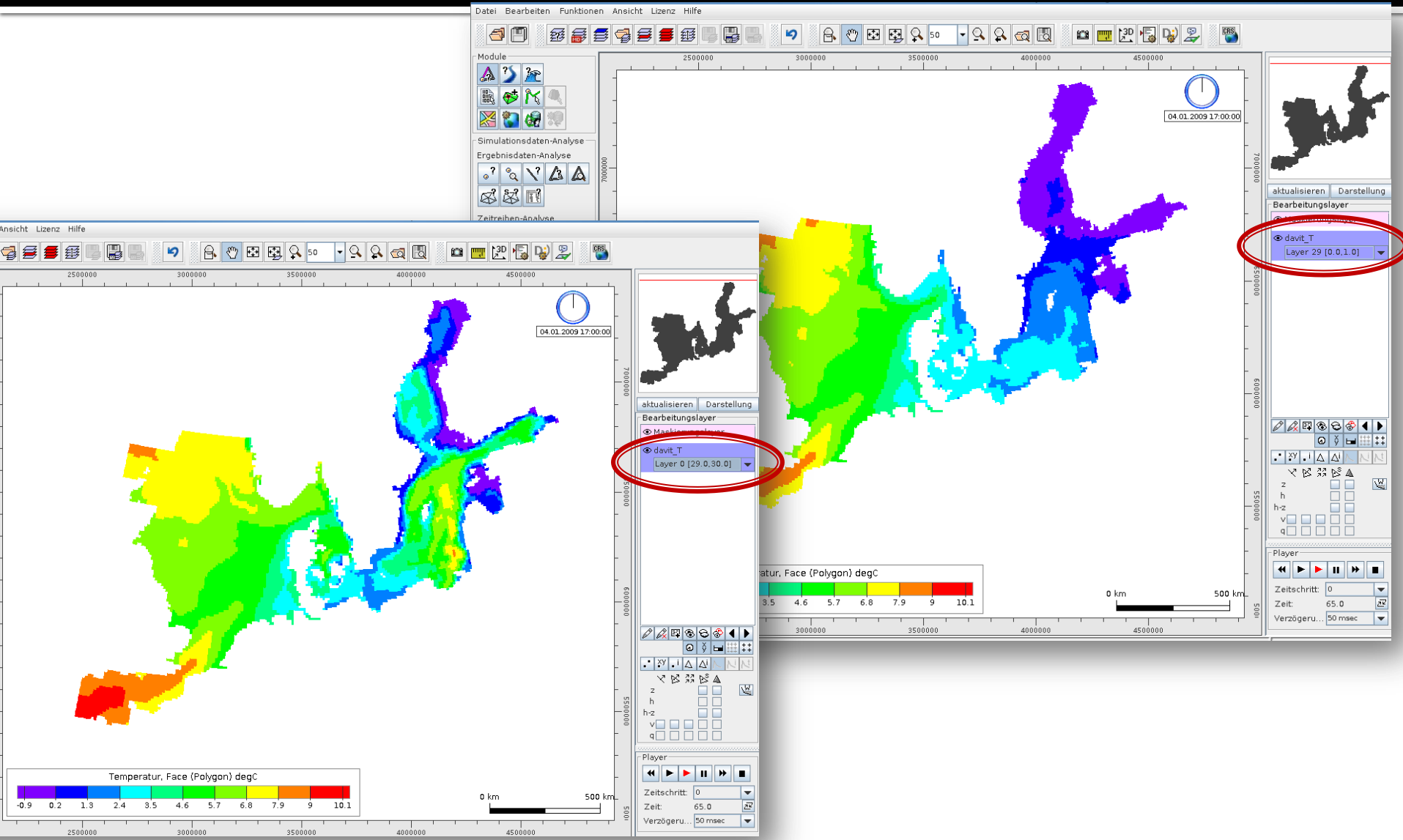
DAVIT:

- Selection of elements
- Timeseries
- Vector-variable names
- Sigma-z-layers

uGrid conversion-algorithm:

- Curvilinear mesh
- Flexible mesh

Problem: sigma z-layers



Problem: double vector-variable

D:\ Davit (Version 2.14.10) BAW, Netzwerklizenz im Rahmen eines Kooperationsvertrages

Datei Bearbeiten Funktionen Ansicht Lizenz Hilfe

Module

Erweiterte Einstellungen für die Zeichenfläche

Optionen

Layerwahl

Maskierungslayer

davit_T

Vektoren

Vektorbeträge

Vektorkomponente X

Vektorkomponente Y

"No-Data"-Werte (NaN / FillValue) in Elementen mit mindestens eine... nicht ersetzen

Darstellung aktualisieren

Änderungen zurücknehmen

Einstellungen laden

Einstellungen speichern

Fenster schliessen

Allegeme... Einstellungen

Trockenfallen

Bottom

Stroemungsgeschwindigkeit, Face (Polygon)

magnitude_of_sea_water_velocity

Gesamtwassertiefe [face]

z_face [face]

z_edge [edge]

surface_biomass_phototrophic_radiative_flux, Face (Polygon)

wave_number, Face (Polygon)

wave_height, Face (Polygon)

concentration_of_SPM_upward_flux_at_soil_surface, Face (Polygon)

turbulent_diffusivity_of_momentum_at_soil_surface, Face (Polygon)

temperature_at_soil_surface, Face (Polygon)

wave_direction, Face (Polygon)

wave_period, Face (Polygon)

Temperatur, Face (Polygon)

velocityAtSoil_surface, Face (Polygon)

magnitude_of_velocityAtSoil_surface

wind_velocityAt10m, Face (Polygon)

magnitude_of_wind_velocityAt10m

aktualisieren Darstellung

Bearbeitungslayer

Maskierungslayer

davit_T

Layer 29 [0.0,1.0]

z

h

h-z

v

q

Player

Thank you for your attention

Source code and documentation can be found under:

<\\themis\system\akprog\python\qad\convert2ugrid>

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