

## **Introduction to the use of 2D-velocity models within REFLEXW**

A 2D-velocity model will be used for different applications:

- migration
- time-depth conversion
- CMP-stacking
- NMO-correction

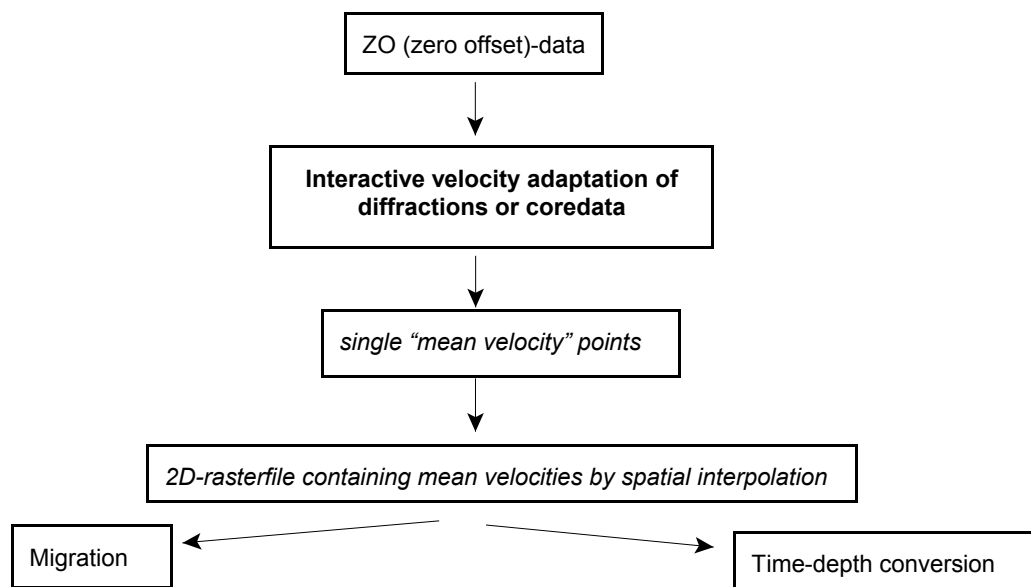
Depending on your data different methods for creating a 2D-velocity model are suitable.

A layered model may be useful if distinct reflections are visible whereas a more smooth velocity model might be a good choice if only diffractions are present. It is possible to extract the velocity informations from the data to be processed (e.g. ZO data with diffractions for a subsequent migration or single shot data for a subsequent stacking) or from totally different data (e.g. refraction data). Therefore different methods for creating a 2D-velocity field are implemented within Reflexw:

- interactive velocity analysis of zero offset data
- CMP velocity analysis
- layer picking within zero offset data
- interactive model generation based on seismic refraction data
- tomographic inversion

## 1. 2D-model from the interactive diffraction analysis

-> single mean velocity points from which a 2D-mean velocity model is created by spatial interpolation

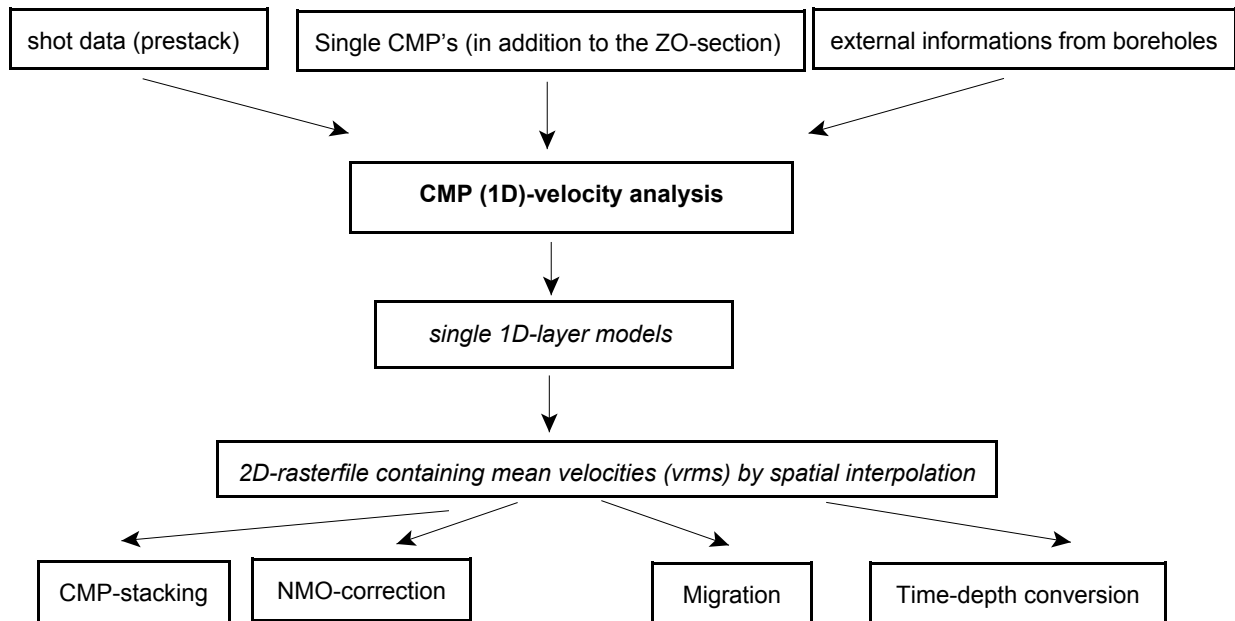


step by step guide:

- load the ZO-profile
- activate the option velocity adaptation
- choose and adapt the wanted diffractions or use the coredata adaptation
- save the adaptations on file
- click on 2D and enter a rasterfilename (optional)
- activate within the processing migration menu any of the 2D migrations or the timedepth conversion
- choose hyperb.adaptation (creates automatically a 2D-rasterfile) or rasterfile mean if you manually created a rasterfile using the option 2D
- perform the processing - the hyperb.adaptation file or the mean rasterfile will be queried.

## 2. 2D-model from CMP velocity analysis

-> single 1D-layer models from which a 2D layer velocity model is created by spatial interpolation



step by step guide for shot data (for a detailed description of the CMP-geometry and stacking see the seismic reflection guide)

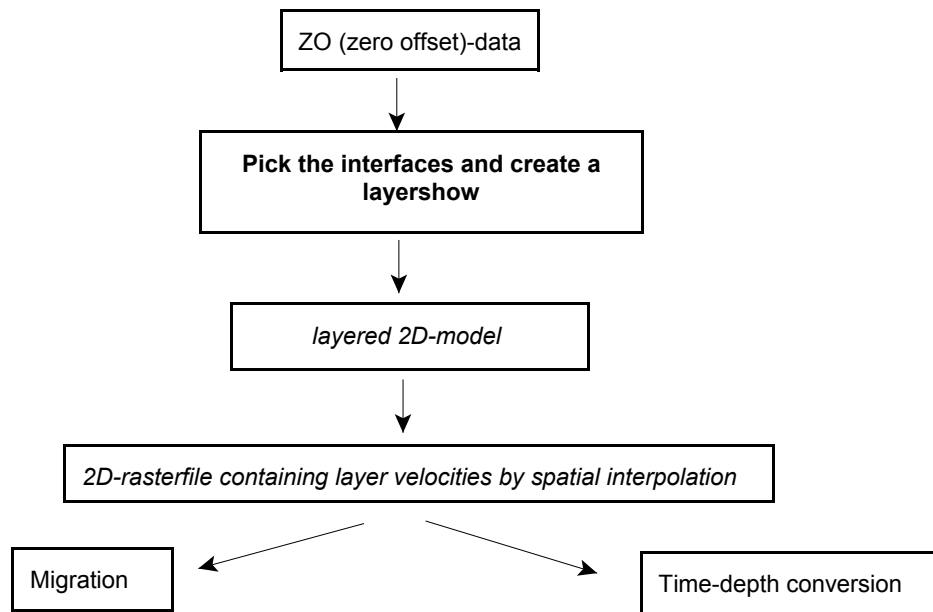
- load the single shot data (all shots must have been stored within one single file)
- activate the option CMP and choose the wanted ensembles for the velocity analysis
- enter the velocity analysis and create the 1D-models for the chosen ensembles
- enter the 2D-model panel and create the 2D-model (2dm-file). If a rasterfilename has been entered this Reflexw rasterfile can be used later for stacking
- close the velocity analysis menu and activate load 2D-model. Activate for filetype 2D-models if you want to load the created 2D-model (spatial interpolation will be done automatically). The filetype Reflexw rasterfile mean allows you to load the already rastered mean velocityfile when creating the 2D-model.
- perform the stacking or the nmo correction

step by step guide for ZO-data and additional single CMP-data

- enter the CMP(1D)-velocity analysis menu load the single CMP data
- create the 1D-model for the choosen CMP and enter the shot and model position
- load the next CMP and create the next 1D-model together with the correct shot and model position
- enter the 2D-model panel and create the 2D-model (2dm-file). If a rasterfilename has been entered this Reflexw rasterfile can be used later for migration or timedepth conversion
- close the velocity analysis menu and enter the 2D-analysis module
- activate within the processing migration menu any of the 2D migrations or the timedepth conversion
- choose CMP-analysis (creates automatically a 2D-rasterfile) or rasterfile mean for the already rastered mean velocityfile when creating the 2D-model.
- perform the processing - the hyperb.adaptation file or the mean rasterfile will be queried.

### 3. 2D-model from the layershow (picked interfaces)

-> Reflexw layer rasterfile

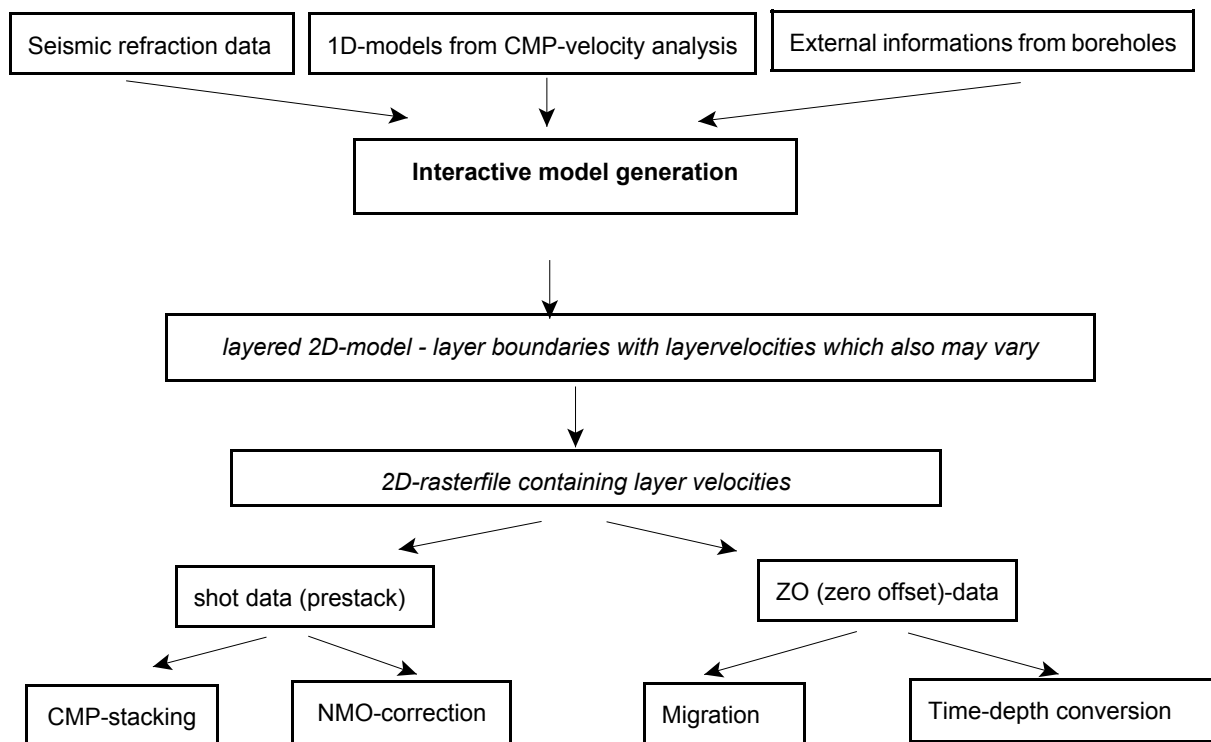


step by step guide:

- load the ZO data within the 2D-dataanalysis
- activate pick and pick the interfaces and store each interface on a separate file with the velocity above the interface (layernumber must increase with depth)
- pick and save a last horizontal layer at the max. travelttime or a little bit less by setting one pick at the profilestart and another pick at the profileend and use the option interpolate (the interface will be continuous). Use for velocity the velocity of the lowermost layer
- enter the layershow and create the layershow using the pickfiles (option layer pick vel. within the velocity choice panel must be chosen).
- click on export and activate the option generate Reflexw rasterfile, click on start
- close the layershow panel and activate within the processing migration menu any of the 2D migrations or the timedepth conversion
- choose rasterfile layer for the already rastered layer velocityfile
- perform the processing - the layer rasterfile will be queried. menu

#### 4. 2D-model from the modelling menu, e.g. from refraction data

-> Reflexw layer rasterfile which will be used for a different dataset like a zero offset file for subsequent processing



step by step guide:

- enter the model generation menu
- create manually a 2D-velocity depth model or generate the model from seismic refraction data or from single 1D-models
- enter a rasterfilename and activate the option fill
- close the model generation menu and load the different dataset (either ZO-data or single shot data)

single shot data:

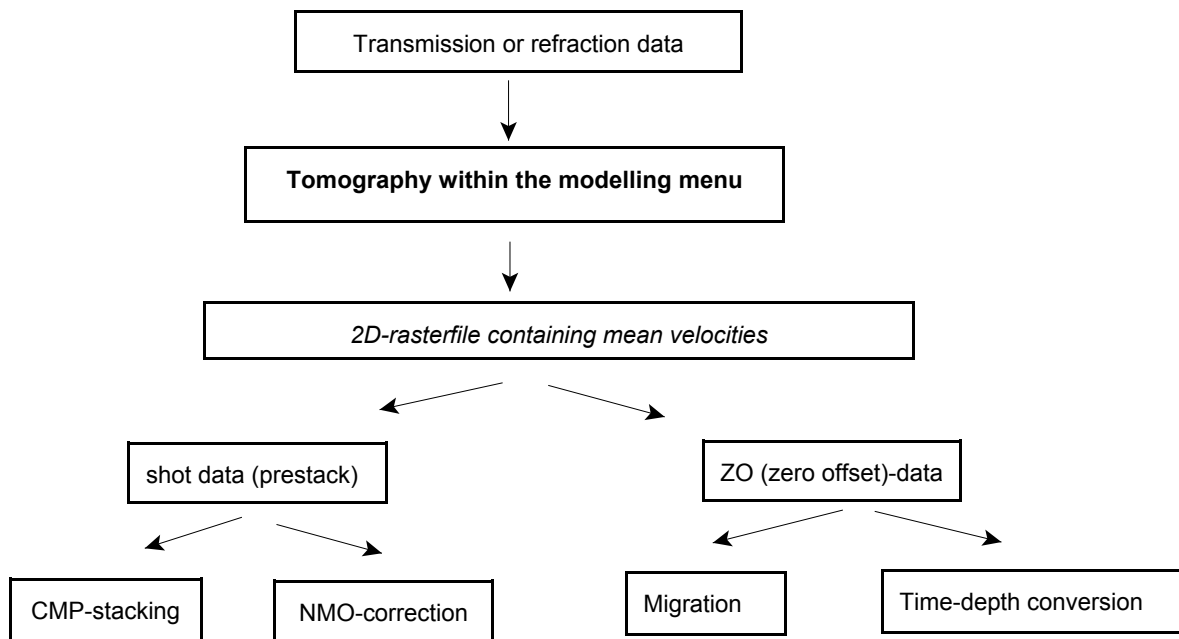
- load the single shot data and activate the option CMP
- choose the wanted ensembles for the stacking
- activate load 2D-model - choose for filetype Reflexw rasterfile layer for the already rastered layer velocityfile
- perform the stacking or the nmo correction

zero offset data:

- load zero offset data and activate within the processing migration menu any of the 2D migrations or the timedepth conversion
- choose rasterfile layer for the already rastered layer velocityfile
- perform the processing - the layer rasterfile will be queried

## 5. 2D-model from tomography

-> Reflexw mean rasterfile which will be used for a different dataset like a zero offset file for subsequent processing



step by step guide:

- enter the model generation menu
- perform a transmission or refraction tomography
- close the model generation menu and load the different dataset (either ZO-data or single shot data)

single shot data:

- load the single shot data and activate the option CMP
- choose the wanted ensembles for the stacking
- activate load 2D-model - choose for filetype Reflexw rasterfile mean for the tomographic model
- perform the stacking or the nmo correction

zero offset data:

- load zero offset data and activate within the processing migration menu any of the 2D migrations or the timedepth conversion
- choose rasterfile mean for the tomographic model
- perform the processing - the mean rasterfile will be queried