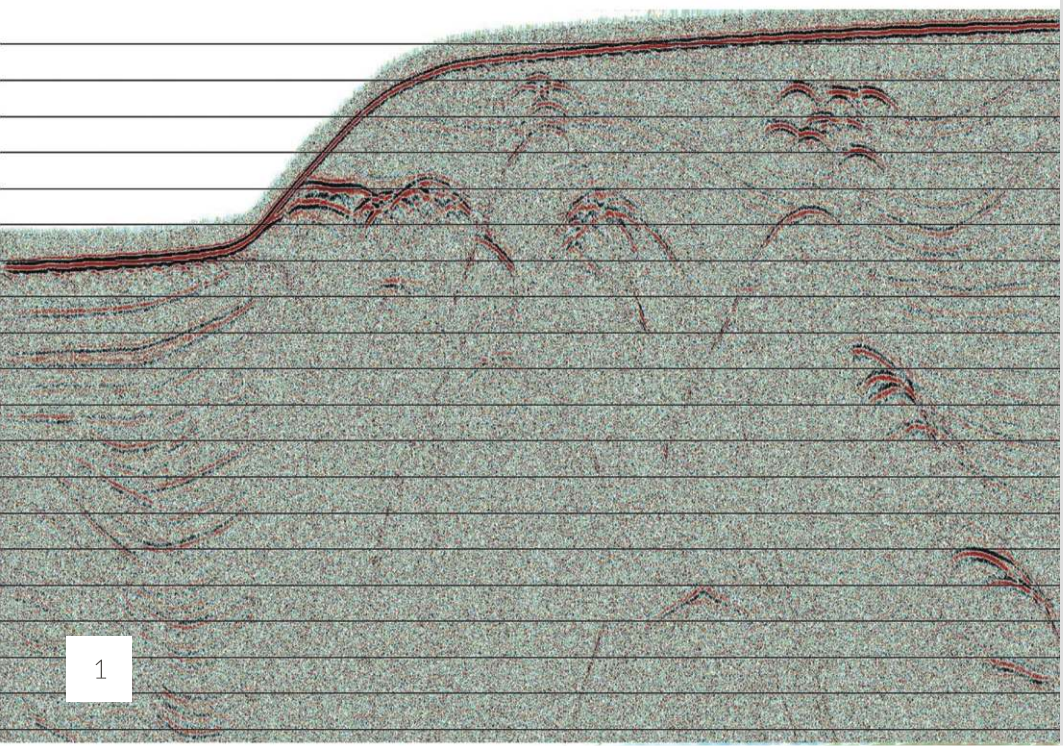

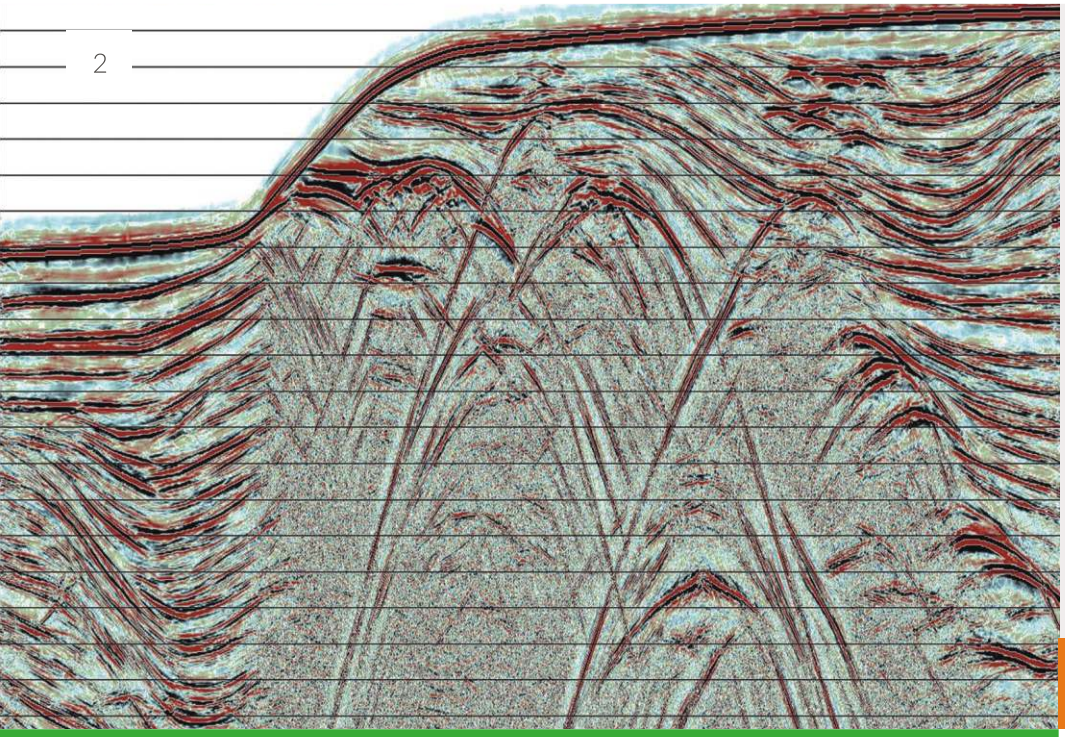

1 - Conventional processing with conflicting dips
2 - ECP method preserves conflicting dips

ENHANCED COHERENCY PROCESSING (ECP)

GENERALIZED STACKING METHOD TO PRESERVE CONFLICTING DIPS

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GRUPA PGNiG

GT PROCESSING SOLUTIONS

ENHANCED COHERENCY PROCESSING (ECP)

In cases when seismic dataset is characterized by low S/N ratio, conflicting dips, complex geology or low-fold data and standard processing procedures are not sufficient enough to obtain correct structural image, generalized stacking methods provide the needed remedy.

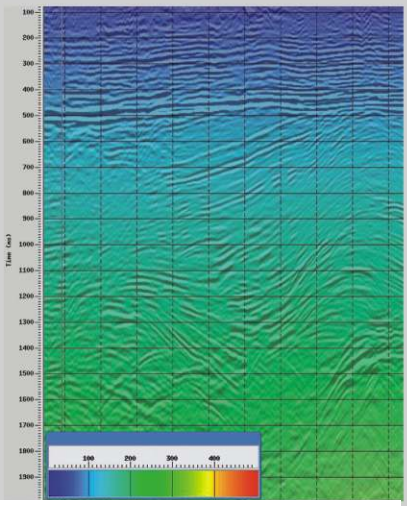
Second release of GT's Enhanced Coherency Processing (ECP) has been designed to derive more information from recorded seismic data in comparison with conventional CMP stacking method or CRS. Instead of just CMP localized in space, ECP method collects coherent signal through nearly whole Fresnel zone of constructive interference and takes into account results of dense scanning for optimum attributes.

Four attributes are estimated, incorporated into solution and provided to the user for subsequent QC:

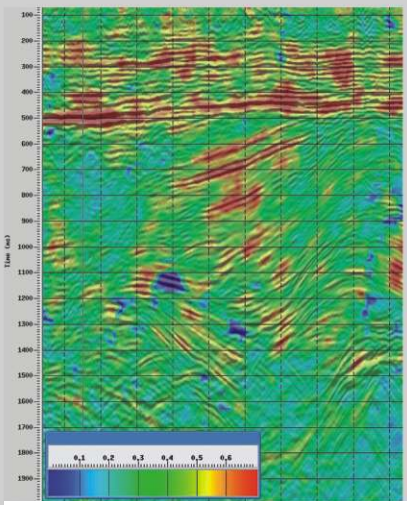
- Fresnel zone
- angle
- semblance
- R_{NIP}

These attributes are used by software in order to estimate: ECP aperture to scan dips, direction and quality of selected zero-offset dips, dips separation and ECP's abilities with reference to original data. ECP attributes can be easily visualized, checked and corrected if needed.

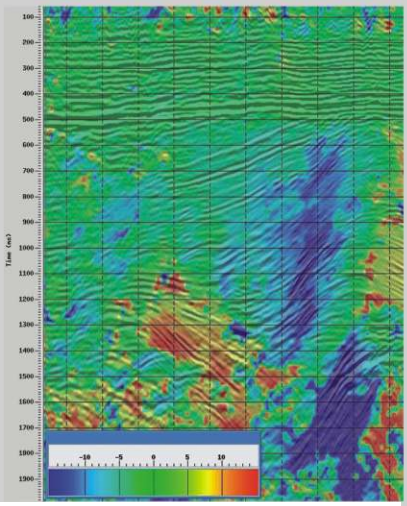
Main feature of the new ECP 2014 release is the preservation of interfering events such as reflections and diffractions, which cross other true events or migration bowties. Separation and proper processing of different dips are crucial to obtain correct image of geology.



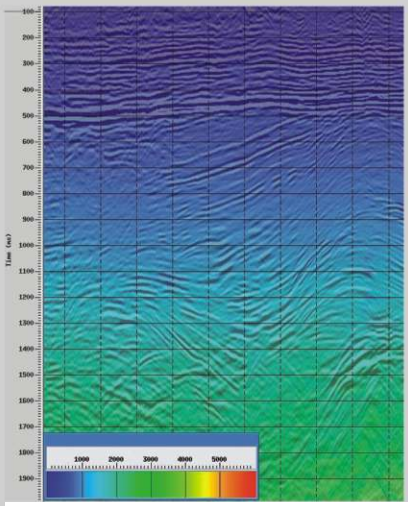
Fresnel zone



Semblance



Angle α

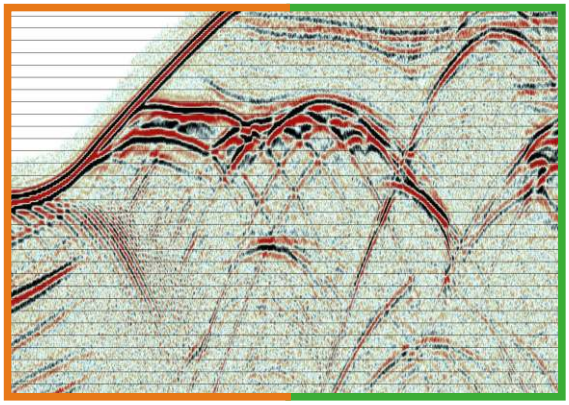


R_{NIP}

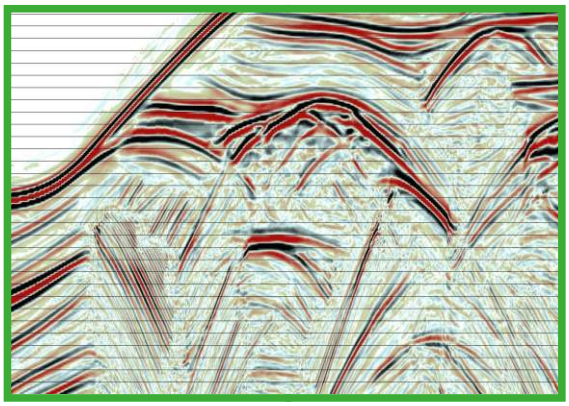
Features of the new ECP method:

- preservation of conflicting dips
- increase signal to noise ratio for scanned angles by semblance scaling
- improvement of seismic image of complex geology, especially for low CMP fold of data
- improved efficiency of velocity analysis and velocity model estimation, therefore improved results of pre-stack time and depth migrations
- can be applied to pre-stack or post stack data in both, 2D or 3D seismic, land or marine
- efficiency proven in various geological settings

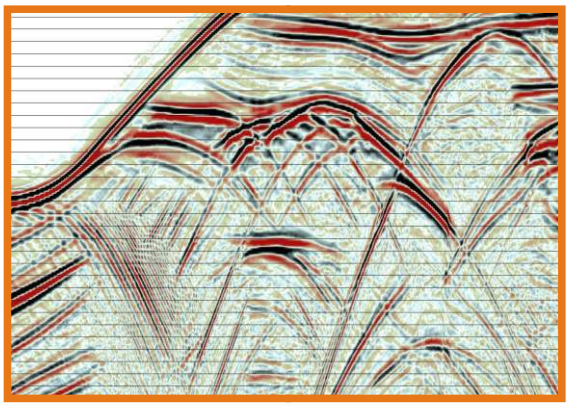
Efficiency of conflicting dip preservation was confirmed on numerous data. Diffractions, which were crossing each other, are correctly mapped, enhanced, and their continuity is improved with reference to the original data (conventional stack) and stack after CRS. Synthetic data without noise were also compared with the same set of data after the new ECP was applied. The places where events cross each other are fully preserved and continuity of events remains the same or gets better with reference to the original stack.



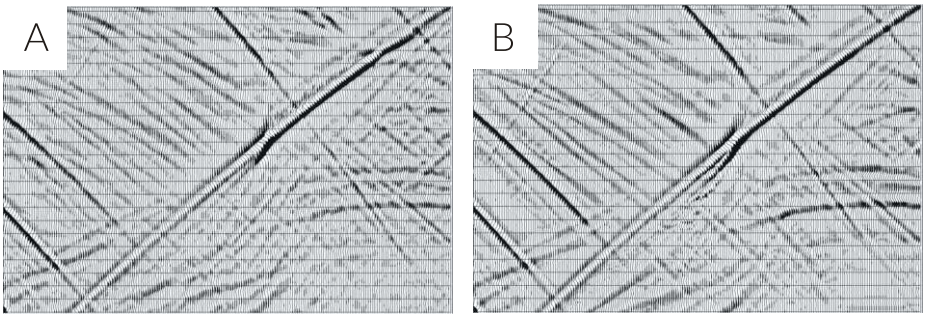
Conventional stack



Stack after conventional CRS



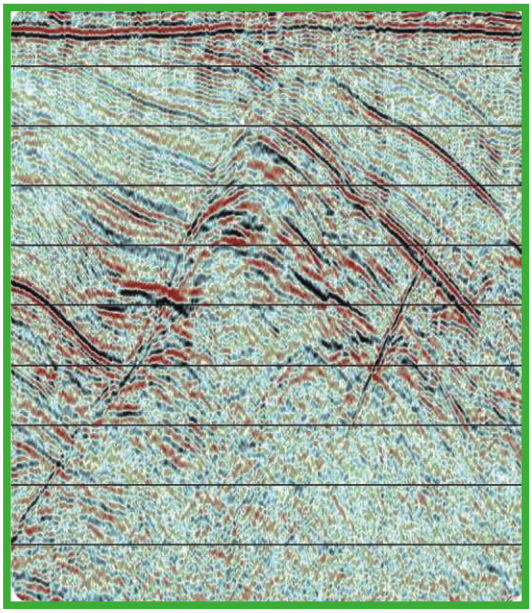
Stack after ECP



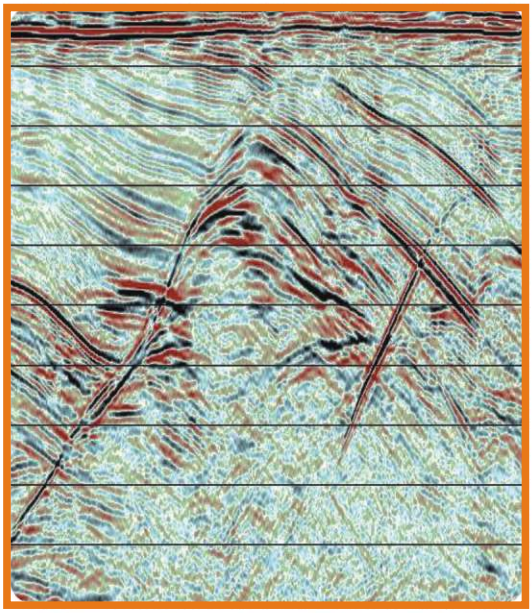
A
Conventional stack with conflicting dips – synthetic data

B
Stack after ECP with preserved conflictinig dips – synthetic data

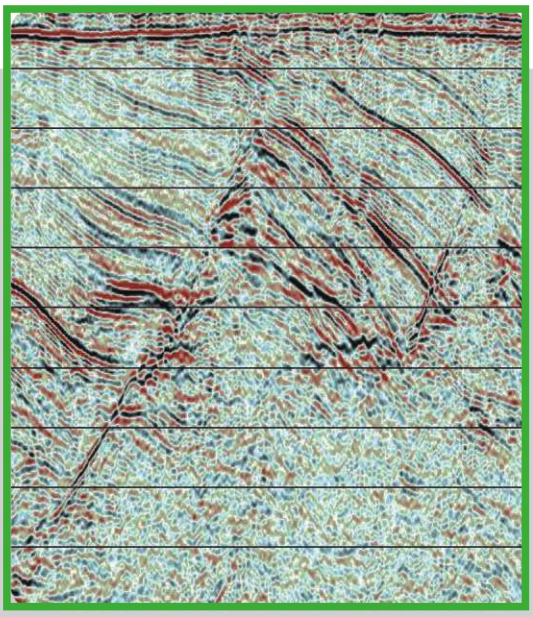
Improved continuity and ambiguity of conflicting dips are crucial for diffractional stacks, as well as for pre-stack time and depth migrations. Iterative migration velocity analyses after ECP allow unequivocal interpretation of final velocity filed. Real data examples, where the same velocity fields were used for pre-stack time migration before and after ECP, show significant improvements. Orange arrows indicate places where conflicting dips occurred and their image before and after pre-stack time migration with and without ECP.



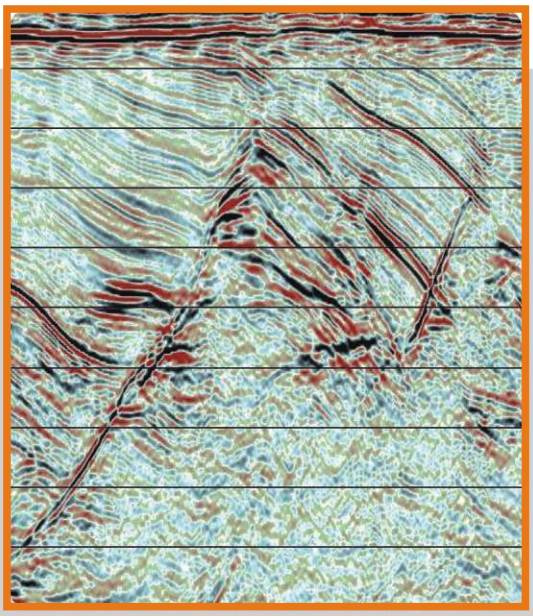
Conventional stack



Stack after ECP



PreSTM conventional stack



PreSTM stack after ECP

Sophisticated methods based on generalized stacking such as ECP are important in areas of complex geology or low S/N seismic. The right solution of structural image in these areas is frequently ambiguous, but crucial for seismic data interpretation. The new ECP method allows to preserve amplitude relations as well as conflicting dips which can create a complex pattern.