Results & Discussion

The Oligocene sequence is deposited by a southwesterly flowing channelized dispersal system which initiates from the lower part of the sequence and becomes prominent in the upper part. The channels are narrow, relatively straight to meandering in lower part (Figure 5), while in the upper parts in addition to these, broad, meandering channels become progressively dominant (Figure 6). In seismic sections, channel morphologies are easily identified due to truncations of seismic reflections. The reflections within channel fills are gently dipping to parallel, indicating steady energy conditions during deposition. Difference in amplitude and frequency are present between the channels and the surroundings. However in some cases, where the channels exist within single seismic events, they are best resolved on RMS amplitude maps, though in such cases sharp lateral variations in amplitude can be seen in seismic sections (Figure 3).

The narrow channels in the lower part that are commonly lateral accretions and meander scrolls are discerned in the higher frequencies. Lithological changes within the channels are resolved across all the frequency bands, with variation of the details resolved. RGB blending of these frequency volumes helps discern subtle variations in the depositional elements and facies (Figure 5e).

Seismic facies classification however is able to resolve most of the channels in the full bandwidth volume, though internal details are at times obscured. To illustrate the efficacy of the work flow, results of a typical interval within the sequence are presented (Figure 5), wherein a channel present within a single seismic cycle is resolved.

RMS amplitude map from the PSTM volume indicates a few weakly resolved channels flowing towards SW. Width of individual channels vary from more than 1.5km to <100m. A weakly resolved westerly flowing relatively straight channel is present in the central part (Fig. 5a, CH-A) and is interpreted to be mostly clay filled. This channel is visible in the PSTM, 10 & 20Hz (Fig. 5a, b & c) and in the facies classification (Fig. 5f), while its presence is well resolved in the 30Hz (Fig. 5d) and weakly resolved in its downstream part in the RGB blended slice (Fig. 5e).

A prominent moderately sinuous channel is present in the central part of the area (Fig. 5a, CH-B). In the upper reaches, this channel shows little contrast from the encasing lithology, while in the downstream parts, it shows lateral accretions and a high degree of contrast with the surrounding, indicating the possible presence of sandy lithologies in the downstream. These differences are prominently seen in the 30 Hz, RGB and facies slices (Figures 5 d, e & f), while they are subdued in the PSTM and absent in the 10 & 20Hz slices (Fig. 5a, b & d). This channel also develops levees (Fig. 5b & e), unlike other channels in the area which do not show well developed levees. The levees appear as broad moderate amplitude areas flanking the channel, which grade into low amplitudes away from the channel.

The low sinuosity narrow channel CH-C, flowing parallel and east of CH-B, has a low amplitude response and is distinct only in the 20Hz volume (Fig 5c), while in PSTM and other frequency volumes its response is subdued or absent. RGB blending also fails to resolve it in a major part, except for its central part. The facies slice however discerns the full length of this channel which has a distinct contrast with the surroundings. Due to the low amplitudes within it in all frequencies, it is interpreted to be clay filled.

A south-westerly flowing channel (CH-D) in western extremities of the area illustrates a case specific effectiveness of seismic facies over the frequency slicing and volume blending (Fig. 5f). This low sinuosity channel is distinct in the seismic facies map, though is either not resolved or patchily resolved in the PSTM, frequency slices and the RGB blending. The non resolution of this channel in these volumes could be possibly due to either its low thickness or due to its fill having the same composition as its immediate surroundings.

In the north central part of the area, a low sinuosity narrow channel is seen in the PSTM, 20 Hz and 30Hz volumes (CH-E, Fig. 5a, c & d). This channel shows a low amplitude response in these two volumes, and seismic facies slices. The channel has a low thickness, which could be a cause for its non-resolution in the lower frequencies.

The southeastern quadrant of the area appears to be free of channels in the PSTM, 10Hz and 30Hz slices (Fig. 5 a, b & d).