Migrate the attached record-section using the three different methods discussed in class.

1) Using the relationship that

\[ \tan(\text{apparent dip}) = \sin(\text{actual dip}) \]

determine the location of the reflector surface corresponding to each record surface in the record section.

The apparent dip is the dip measured from the record section (i.e. the seismic section). The actual dip refers to the dip of the reflector.

2) The reflector surface is tangent to the wavefront that originated at a given surface location. Use a compass and reconstruct the reflector location by locating the common tangent to the wavefronts from the surface coincident source-receiver locations.

3) Using the maximum convexity front constructed in class, determine the actual location of (i.e. reposition or migrate) the two reflector surfaces.

Explain any differences between the locations of the reflector surface obtained using the three different methods.
record  depth  section
Construct the maximum convexity fronts at points 1 and 2.
Construct the maximum convexity fronts at points 1 and 2.
Environmental and Exploration Geophysics II
Migration Exercise (part 2 – take home)

In class the basic concepts of maximum convexity front and wavefront migration procedures were presented to illustrate geometrical aspects of the migration problem. The foregoing in-class example (part 1) illustrates how one can migrate the record surface onto the corresponding reflector surface. The distribution of reflection arrival times in Figure 1 is much more complex than for the simple exercise discussed in part 1, but the procedure for locating the reflector surface is basically the same.

Reflection events from the top and bottom of the layer shown (Figure 1) are plotted separately in Figures 2 and 3, respectively.

For this assignment you will be using diffraction overlays (Figures 4 and 5) to migrate the reflection events. These overlays provide the diffraction response for the range of reflection times present in the data (Figure 1).

Interval velocities for the model at 3 different points on the surface are provided in the table below.

<table>
<thead>
<tr>
<th>CDP location</th>
<th>5000 feet</th>
<th>20000 feet</th>
<th>35000 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>time</td>
<td>V&lt;sub&gt;int&lt;/sub&gt;</td>
<td>time</td>
</tr>
<tr>
<td>5000 feet</td>
<td>3.0</td>
<td>10000</td>
<td>1.8</td>
</tr>
<tr>
<td>20000 feet</td>
<td>3.5</td>
<td>16000</td>
<td>3.05</td>
</tr>
</tbody>
</table>

EXERCISE:
Given the diffraction overlay migrate the time section (Figure 1).
Interpret this section. What if any pitfalls are present? Did you convert to depth?
Figure 1: normal incidence reflection arrival time display
Figure 2: Normal incidence reflection arrival times from the top of the layer.
Figure 3: Normal incidence reflection arrival times from the base of the layer.
Figure 4: Diffraction response or maximum convexity fronts for shallow events.
Figure 5: Diffraction response or maximum convexity fronts for deeper events.