Supplemental Material

Stratigraphic Data Used

Agabekov et al. (1971) produced a 1:1,000,000 scale tectonic map of Azerbaijan that is included with a more detailed report on the geology of Azerbaijan compiled by Azizbekov et al. (1972), which is part of a larger series of geological reports for regions within the former Soviet Union. Although, the Agabekov et al. (1971) map interprets the geology of Azerbaijan in terms of geosynclinal theory, it also includes a structural contour map showing the base of the Akchagyl sediments within Azerbaijan, which we have reproduced in Figure 8b. We used stratigraphic sections within this report to constrain unit thicknesses and variations within Azerbaijan. The detailed article of Agabekov et al. (1976), later translated from Russian into English, documents the sedimentary section within the central Kura basin in the vicinity of the Saatly wells (Figure 8b). This article includes several structural contour maps and a schematic cross section of the Kura basin sedimentary sequence that aided in establishing the subsurface geometry of the Kura basin sediments and provided additional constraints for thicknesses. We also used the article of Agabekov et al. (1978) that importantly contains four well logs from the Saatly wells (reproduced in Figure 8a), although the main focus is on the Cretaceous section. Jones and Simmons (1996) describe the stratigraphy of the Caucasus and surrounding regions in broad terms. This article was used to correlate the regional stages and formations with the global chronostratigraphic time scale. Inan et al. (1997) focused on petroleum resources in the South Caspian depression, but includes a useful repository of sedimentary thicknesses within the South Caspian. Data from this article was mainly used as a point of comparison between the sedimentary character and thicknesses of units in the Kura basin and the South Caspian depression. Gasanov and Alyyeva (2003) focused on the stratigraphy and occurrence of Apsheron and Akchagyl sediments in the southeastern corner of Azerbaijan. The article included a coarse isopach map of the Akchagyl sediments within Azerbaijan that was useful for a broad sense of the stratigraphic geometry of the Kura basin.

Process of Map Compilation Leading to Updated Geologic Map (Plate 2)

There were two stages to the compilation. First, we georeferenced the Nalivkin (1976) map using tie points derived from topographic and political features, including river junctions and distinctive sections of coastline located on the LANDSAT and ASTER imagery, as well as cities and political borders from the Digital Chart of the World available at www.maproom.psu.edu/dcw. The political data is originally from the Operational Navigational Charts produced by the Defense Mapping Agency and can be downloaded as shape files in WGS 1984 geographic coordinates. Once georeferenced, outcrop patterns in the Nalivkin map generally aligned closely with fold axes in the neotectonic map, although minor systematic offsets between the two maps remained because the original base map used by Nalivkin appears to have contained distortions and/or errors. These mismatches were corrected in a second stage of compilation, during which we evaluated the quality of the constraints on the locations of features in the geologic vs. neotectonic data. For example, when the location of an axial trace was well constrained by bedding measurements in the neotectonic data but the outcrop pattern on the geologic map failed to align with both topography and the axial trace, the contact locations were adjusted. Alternatively, when the geologic map matched the topography but the location of the axial trace was poorly constrained by the neotectonic data, the location of the axial trace was adjusted to fit with the pattern of contacts on the Nalivkin map.

References

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Supplemental Figure 1, Forte et al.

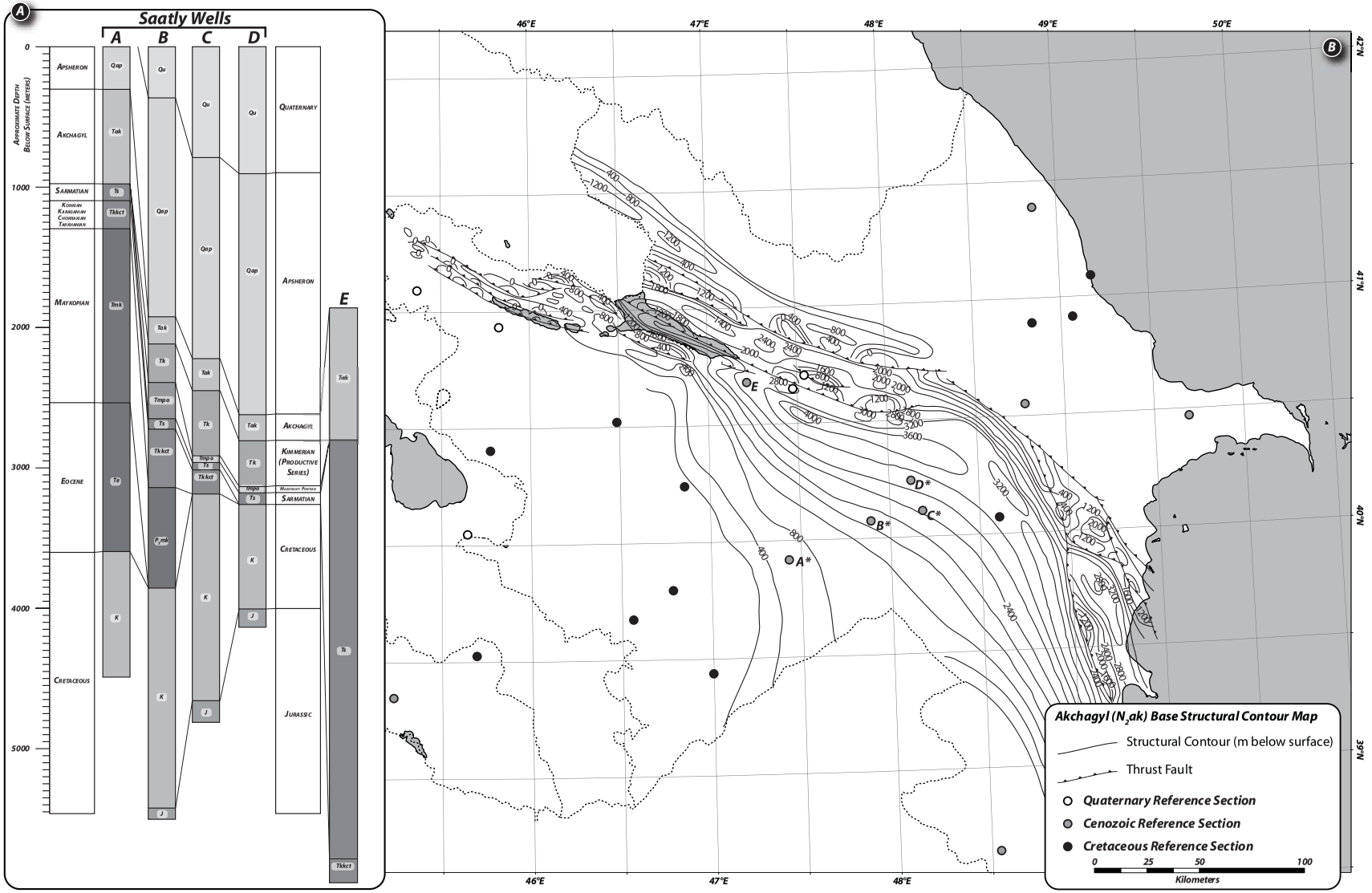
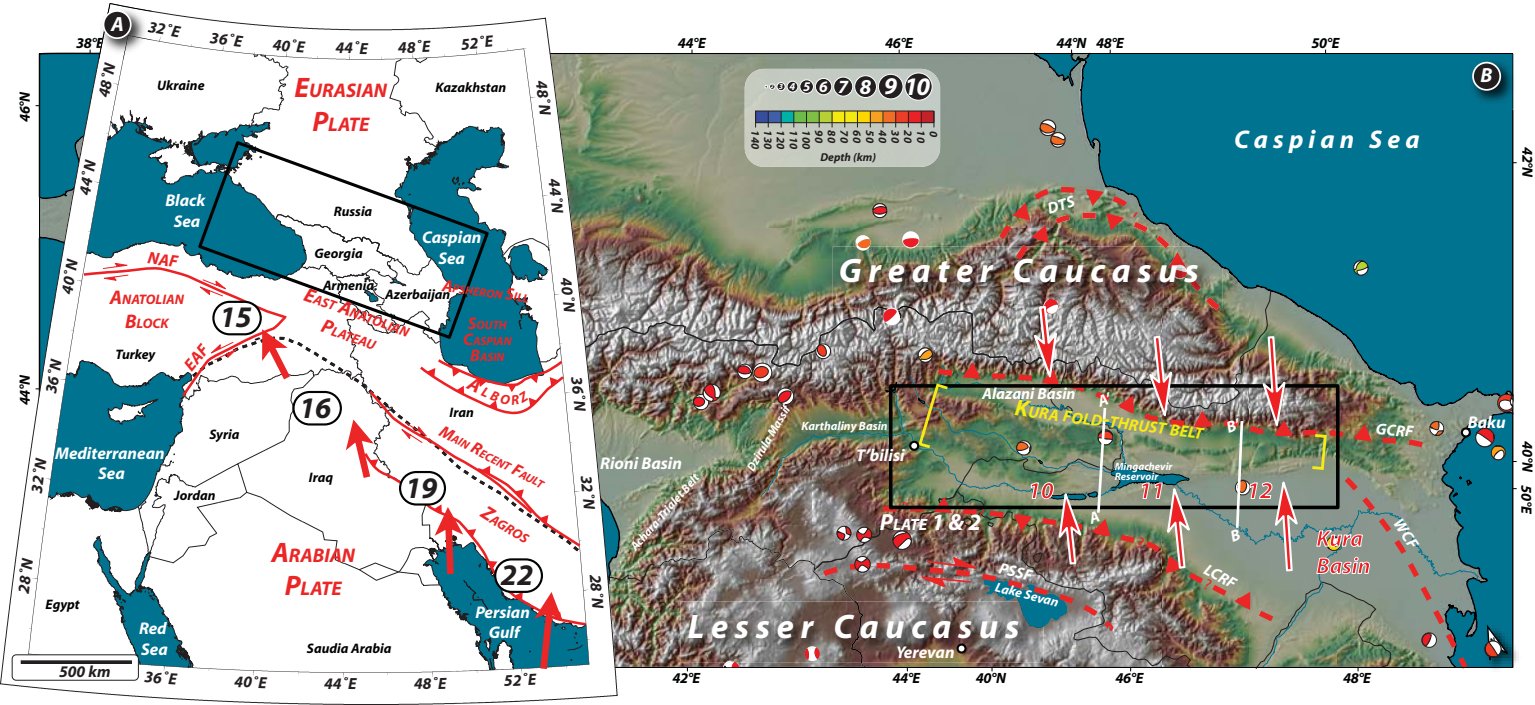


Figure 1, Forte et al.



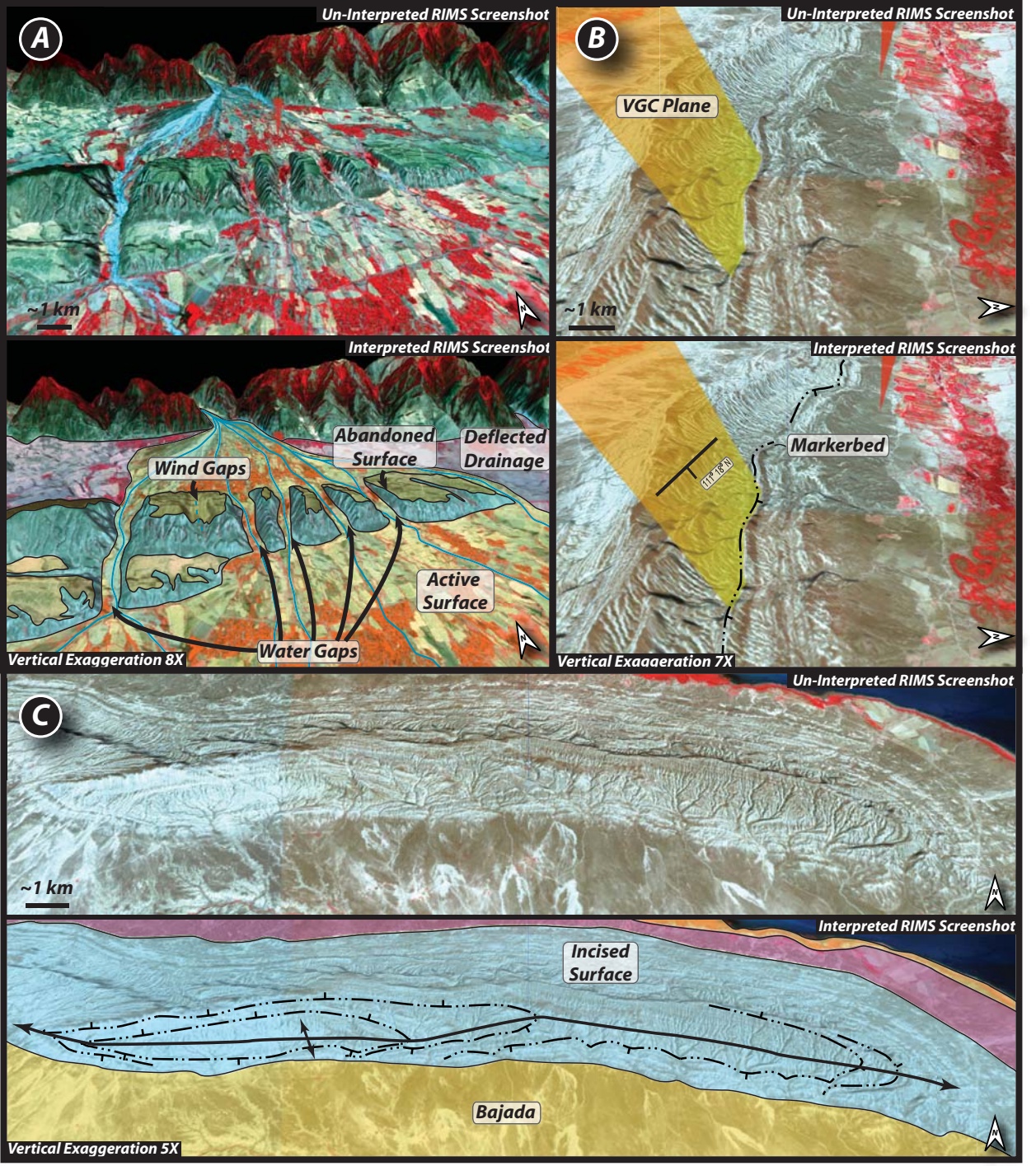


Figure 3, Forte et al.

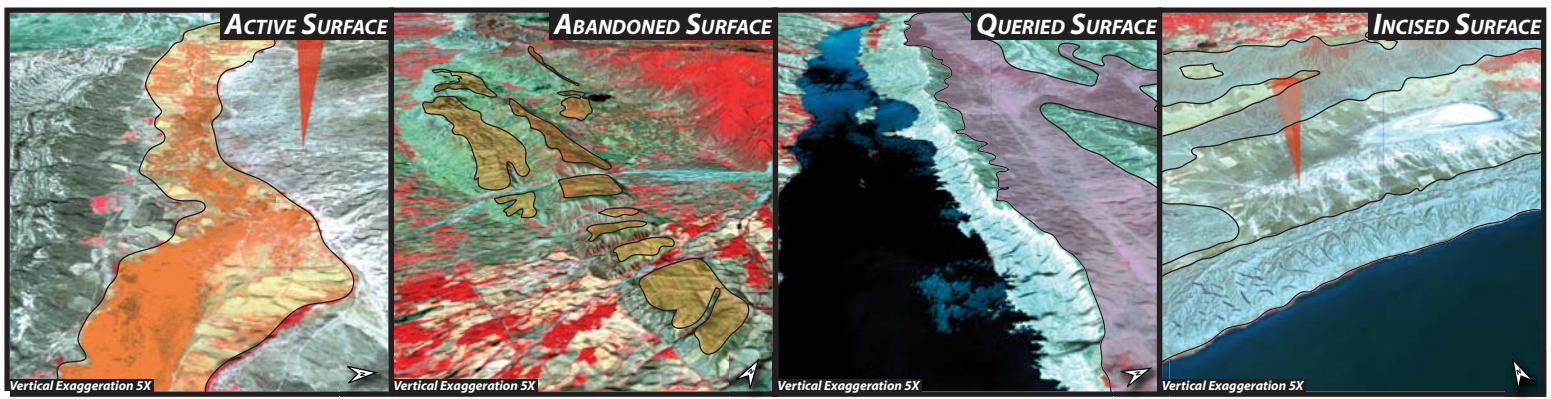


Figure 4, Forte et al.