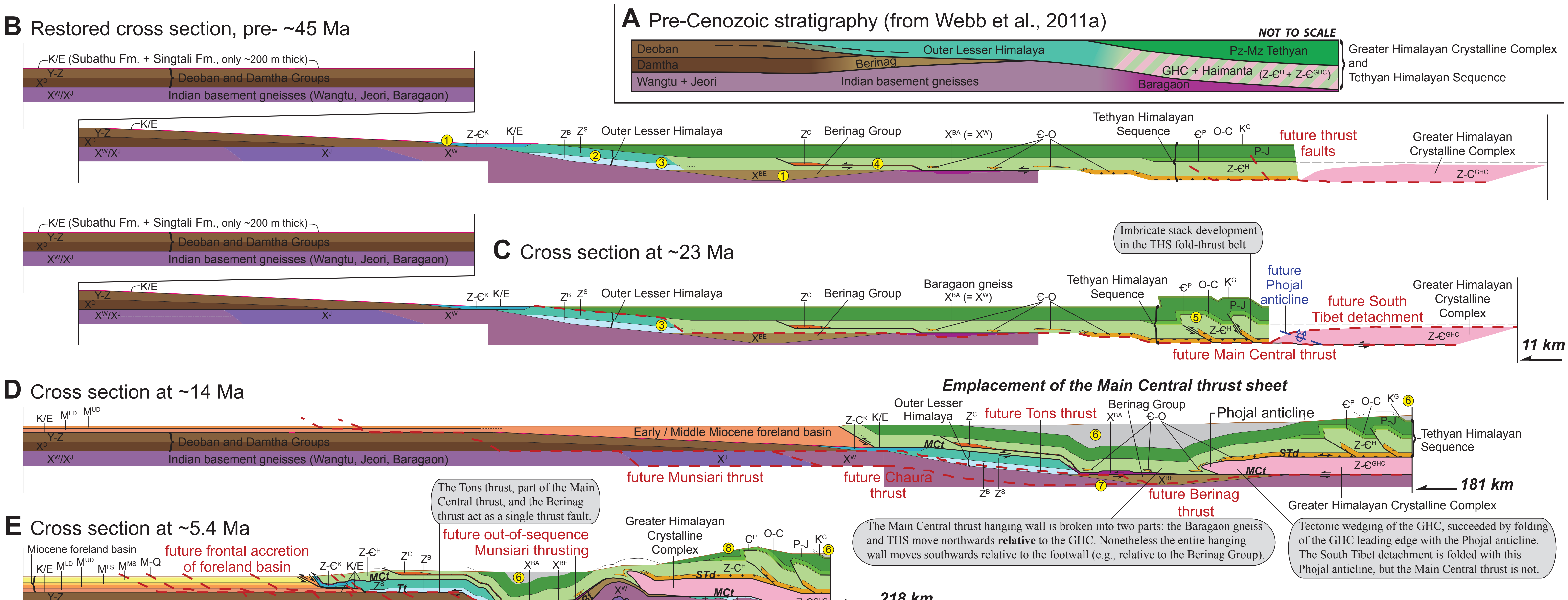

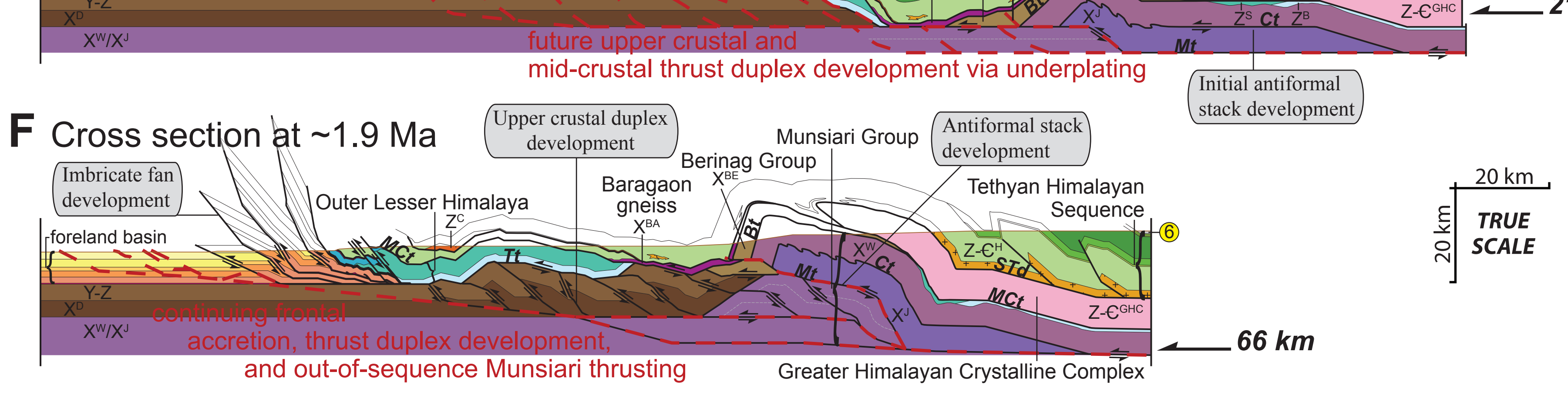

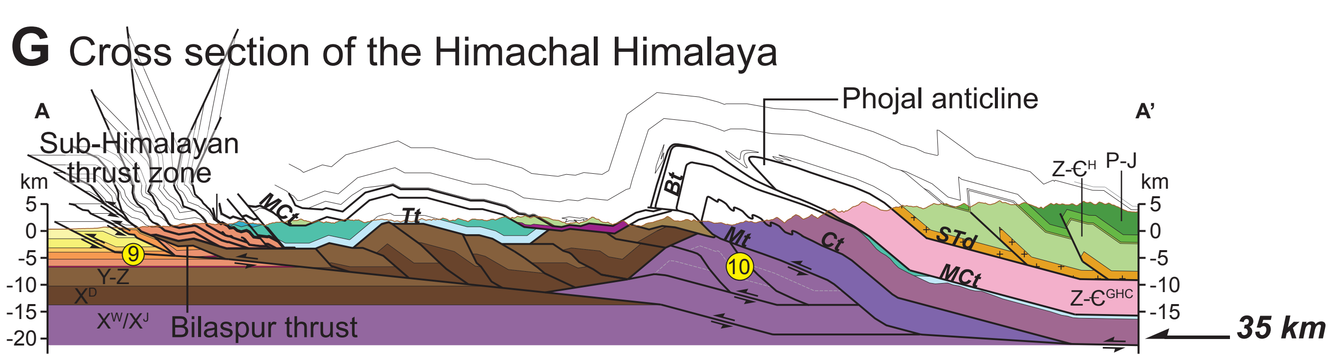

Shortening Estimates

Present-day length = 202 km

Restored length = 720 km

Minimum Cenozoic shortening = 518 km (72%)

Figure 5. Webb

NOTES: ***locations shown with circled numbers.***

1. Differences between the preferred pre-Cenozoic stratigraphic model (section A) and the restored cross section (section B) arise because the former is not a minimum shortening model, i.e., it does not allow as little shortening as the section B geometry. Two key differences in the restored section are: first, the juxtaposition of the Krol Fm. of the Outer Lesser Himalaya atop the Deoban Group (differs from a uppermost Deoban - basal Outer Lesser Himalaya continuity); second, the position of the Berinag Group bordered by Indian basement to the southwest (differs from a continuous Damtha Group - Berinag Group layer).
2. The tilted geometry for the restored Outer Lesser Himalaya is (barely) plausible and minimizes shortening. With increased total shortening, the overall geometry could be altered such that the tilt is increasingly diminished. The southernmost part of this unit must be in the near-surface because it underlies Cretaceous / Eocene rocks along a depositional contact.
3. The northern cut-off of the Late Proterozoic Outer Lesser Himalayan rocks (Shimla Slates, Basantpur Fm.) loosely represents a footwall cut-off for Late Proterozoic Tethyan rocks (Haimanta Group).
4. The thrust drawn carrying the Z^C (~830 Ma) granites is speculative. Specifically, ductile shear zones are observed at its northern end and below the large granite body to the south (exposed east of the line of section) (Das and Rastogi, 1988; Singh and Jain, 1996), but the connection between these two thrusts drawn here is speculated. The thrust is assumed to be an Early Paleozoic structure (1) to minimize Cenozoic shortening and (2) in light of evidence for local Early Paleozoic tectonism including garnet grade metamorphism (Webb et al., 2011a).
5. The restoration of the deformed Late Proterozoic - Cretaceous Tethyan sequence shown here (see sections B, C) is a simplified version of a restoration conducted ~10 km northwest of the line of section by Wiesmayr and Grasemann (2002).
6. In sections D, E, and F, grey areas represent volumes that were likely below the ground surface but would not be occupied by known sequences. These "empty spaces" might be filled by now-eroded piggy-back basins and/or by known rock units that experienced unpreserved shortening and associated thickening. Sections B and C are not sufficiently well understood to warrant estimation of the topographic surface.
7. The future sole thrust is shown to cut downsection slightly in the propagation direction, a violation of simple thrust rules. Two considerations encourage retention of this geometry: (1) the geometry allows for minimum shortening, and (2) the isostatic effect of the growing thrust wedge would deflect the hinterland down, plausibly eliminating any structural down-cutting.
8. The inferred ground surface rises artificially high here. This is an artifact of a balancing decision to restore the Munsiari Group horizontally in section E. The downward deflection of the Munsiari Group in the hinterland portions of sections F and G is an approximate representation of isostacy.
9. Geometry of the foreland part of the sole thrust simplified from Powers et al. (1998).
10. The Munsiari Group is modeled as an anticlinal stack of 6 thrust horses. The highest horse is the Wangtu gneiss emplaced along the Chaura thrust, and the next horse below is the Jeori metasedimentary rocks emplaced along the Munsiari thrust. Remaining horses are not exposed.