or right-lateral sense, but the distribution is not random. One sense or the other usually dominates for about ten ridge segments.

In western Aphrodite, ridge crests representing the center of symmetry of axial regions are offset at cross-strike linear features in a consistent right-lateral sense with offset distances ranging from 200 to 1200 km (Fig. 3A). The age of the crust of Venus is not known in this area and there are no available seismic data, so it is not possible to apply these tests to further the comparison of the intercrest portions of the linear cross-strike structures on Venus and the nature of transform faults on Earth. However, if the ridge crests are the axes of divergent plate boundaries, and the cross-strike structures are fracture zones and transform faults, then the topography on opposite sides of the cross-strike discontinuity should be different. On Earth, this is due to the fact that the topographic changes across transforms are linked to the changing thermal structure of the lithosphere as a function of age (*30*). Newly formed lithosphere cools and becomes topographically lower as a function of time and distance away from the rise crest. Since rise crests are separated along transform faults and fracture zones, the thermal boundary-layer age relationships predict that if one steps down across a fracture zone, then one should observe offset at the rise crest away from the observer (Fig. 2B). These step-down relationships are observed in western Aphrodite (Fig. 3, A and B). For example, if cross-strike discontinuities 4 and 5 (Fig. 4A) are projected along their strike into the lowlands they show distinctive topographic step-downs at about 10° to 15° north latitude. Significant right-lateral offset of the ridge crests is observed where these same linear discontinuities cross the highlands.

Discussion of evidence for divergence and crustal spreading. On the basis of our analysis of the topographic and morphologic data for the western Aphrodite region, and our tests for the presence of analogs to terrestrial divergent plate boundaries and associated features, we conclude that there is abundant evidence for a wide range of features in Aphrodite comparable to those found at terrestrial divergent plate-boundary regions. Specifically, we find evidence in western Aphrodite Terra for (i) the presence of linear topographic rises (Fig. 1), (ii) bilateral symmetry of topography normal to these rises, including small-scale features (Fig. 4), (iii) broad sloping topography suggesting relations like that resulting from a laterally moving and cooling thermal boundary layer (Fig. 5), (iv) the location of median valleys and other analogous features along the crest of rises, (v) the presence of fracture-zone–like

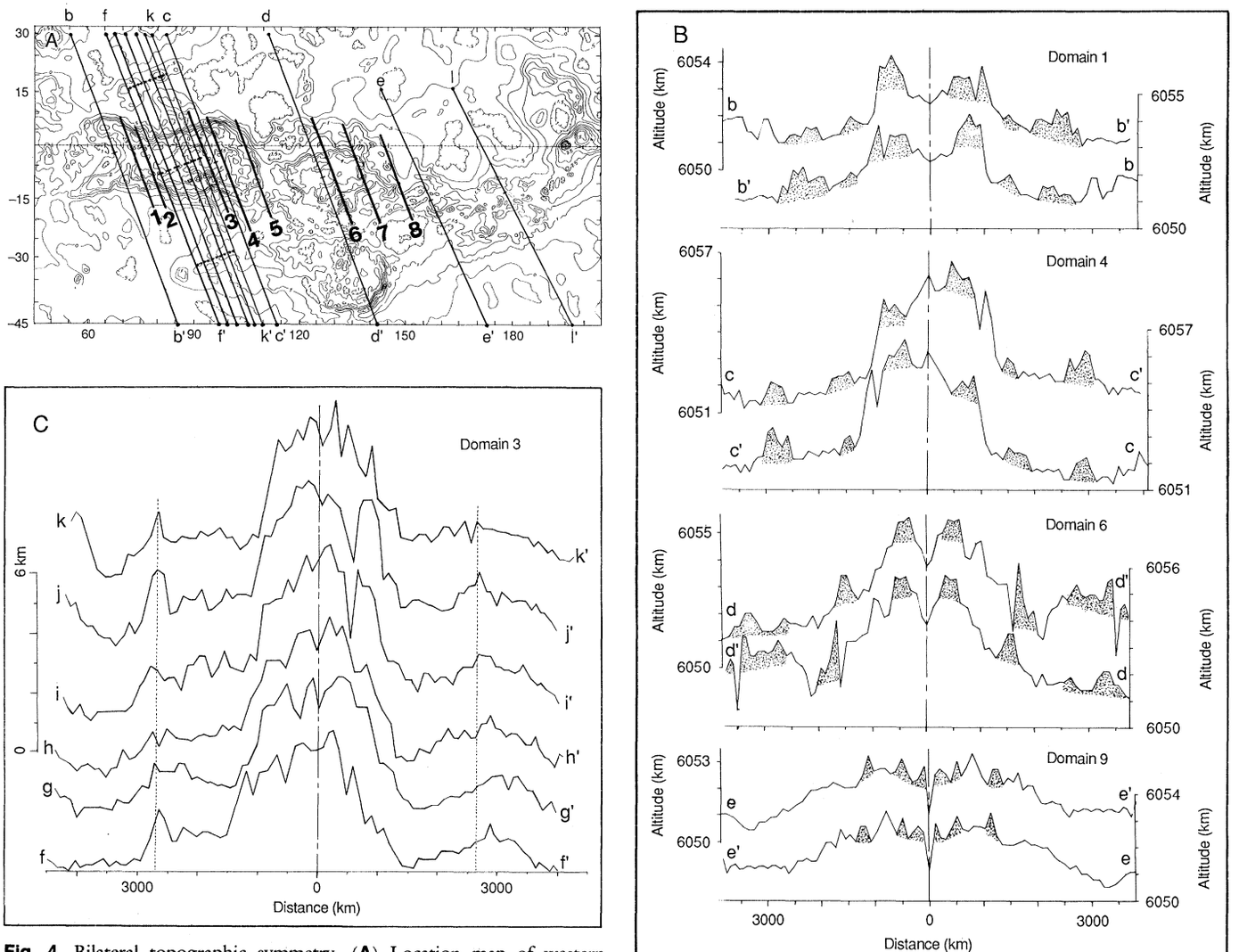

Fig. 4. Bilateral topographic symmetry. (**A**) Location map of western Aphrodite topographic profiles (thin lines) taken parallel to cross-strike discontinuities (*31*). CSDs are designated 1 to 8 from left to right. The center of symmetry of these profiles is indicated by a dashed line across the profile tracks. Dotted lines indicate symmetric elements identified in (C). (**B**) Four typical profiles, which are labeled by the lower-case letter designations in (A) taken parallel to cross-strike discontinuities. Each profile is reversed and compared to the original to enhance the detection of symmetry. Altitudes are reported as planetary radius. (**C**) Similar profiles within a single domain between CSD 2 and 3.