CRUSTAL TENSION AND COLLAPSE ON DEFORMED AREAS ON VENUS, G. G. Ori and L. Marinangeli, Laboratorio di Scienze Planetarie, Dipartimento di Scienze, Universita' d'Annunzio, Viale Pindaro 42, 40127 Pescara, Italy. luciam@sci.unich.it

Large scale extensional structures have been extensively recognised on the Venusian crust. They are very similar to the grabens on Earth, at places, resembling the Terrestrial rifting zones [1]. However, besides these evident features, a more subtle type of extensional structures do exist: they consist of fractures and small tensional basins occurring on areas previously deformed by compressional events [2]. They are rather different from the easier-recognised grabens because they (i) do not show clear extensional faults at their rims, (ii) are at places filled by lava flows, (iii) are associated with previously deformed areas. The tensional basins and fractures have been observed in several settings where probable crustal shortening occurred: ridge belts and dorsae associated with planitae or in fold belts and tesserae, particularly adjacent to the Ishtar Terra. These tensional features produce small basins elongated along the tectonic strike of the previous compressional structures. The basins can be either filled by lava flows or empty. When lava is present the basins are not easily detected because the floor topography is rather flat, however, it dramatically contrast with the horst-like structures made-up of compressionally deformed rocks. The presence of lava is, by itself, an evidence of extension because the magma, to flow up to the surface, needs open fractures and faults as formed by tensional mechanisms. In several instances (*e.g.* Atropos Tessera), a lava supply from external areas can be discarded because the basins rest on higher elevations than the surrounding zones. When basins are empty a major way to recognise their nature is the topographic reconstruction. Footprints of Magellan *ARCDR*s can provide a great help, however in zones with very rough topography stereo images give more reliable data [3]. The Akna Montes and the Atropos Tessera are areas where tensional basins are extensively present (Fig. 1). This zone is similar to extensional zones on the back of several fold belts on Earth (Basin and Range, Tyrrenian Sea, etc.) and probably they have been produced by the same type of large-scale processes: the collapse of mountain chains. Also, dorsae or ridge belts display both empty fracture basins and basins filled by lava flows. These has been extensively observed near several planitae (*e.g.* Niobe, Atlanta, etc., Fig. 2). In several cases the dorsae are entirely fragmented and pervasively flooded by lava flows. This evidence suggest major changes in the crustal behaviour and the collapsing of part of the crust. Terrestrial counterpart are not so widespread as the first type of basins, because this are features that lie within a folded and deformed belt and not adjacent to it. A possible Terrestrial analogue is from the High Atlas of Morocco where several basins occur within the deformed belt. If the presence and importance of these extensional features in compressional belts is true, we must suppose a large crustal mobility that, on Earth, is driven by detachment surfaces. At this stage, we cannot demonstrate the presence of *decollements* on Venus, but they are probably present when extension is remarkable. This is likely the case of the former type of basins (Akna and Atropos) where extension played a major role in the crustal modification. The amount of extension is hardly calculated because the basins are filled. However, the presence to the north of possible sinistral wrench faults could have accommodated an extension as large as the 70% of the originary crust. The fragmentation of the crust at the expenses of the extensional basins seems to drive to the entire disappearance of the former crust with the generation of newly formed lava. This is supported also the association of the these subtle extensional zones with sag basins (circular and subsiding planitae [1]) or lava plains. Tensional fractures and basins are hence regarded as a major mechanism of the collapse of the crust and consequently as a process for global resurfacing. In the studied areas, the extensional basin and fractures are among the younger, if not the youngest, geological features. The larger extensional zones (chasma) resembling Terrestrial [4] riftings do not to seem to contribute to the processes of resurfacing because they are not linked with large-scale production of new crust.

REFERENCES: [1] Senske D.A. et al., JGR, 97, 13395. [2] Ori G.G. et al., LPSC, 26, 1085. [3] Jankowski D.G. and Squyres S.W., LPSC, 26, 675. [4] Bindshadler D.L., JGR, 97, 13495

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Fig. 1 - The Akna Montes and Atropos Tessera are organised in a swell and ridge wise. These swells represent extensional basins filled by lava flows.

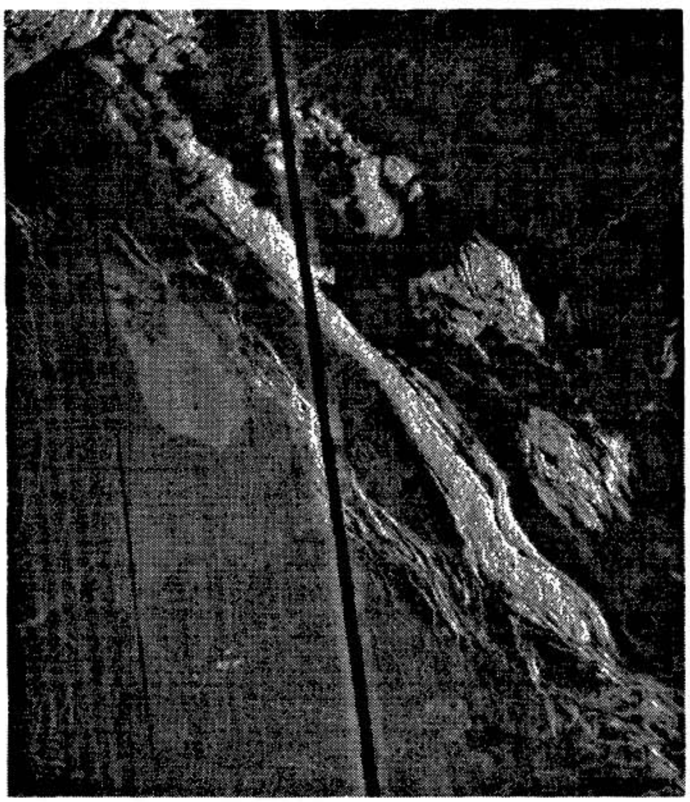

Fig. 2 - The Uni Dorsa, adjacent to the Niobe Planitia, is strongly fragmented by extensional mechanisms. Some intra-dorsa basin (filled by lava) are still present, but large part of the structure is cannibalised by the lava fields of the planitiae.