TECTONICS OF NEYTERKOB CORONA ON VENUS; K. Kauhanen, Department of Astronomy, University of Oulu, SF-90570 Oulu, Finland

Neyterkob double corona (50°N 202°) presents an area of corona-related interfering tectonic patterns which are formed in different phases of evolution of the corona and modified by regional stresses. Analyzing the patterns can reveal us something about the coronal formation. Tectonic features form distinct units on topographic depressions, slopes and volcanic flows extending over one radius of the corona. A remarkable amount of compressional features were found near the rim and related to interaction between adjacent coronae. Radial extension was manly observed on a peculiar NE-SW trending high crossing the corona. Concentric fractures were found to the east partly connected to the lithospheric flexure. Tectonic features indicate movements of volcanic activity and modification of the area by more regional stresses.

Coronae are circular or elongate surface features characterized by concentric belt(s) of ridges or fractures and/or a raised rim. Central region is usually higher than outside plains. The width of the annulus varies from 10 to over 200 km and diameters from 60 to over 2000 km [1]. Many of the individual coronae are asymmetric or multiple indicating movements of activity with time. Coronae in clusters or chains do not indicate formation by lithospheric movement over hotspots [1]. Origin of a corona by an upwelling mantle plume explains its general evolution by sequence of initial updoming of the lithosphere followed by a flattening of the diapir and gravitational relaxation due to cooling of the diapir [2].

Neyterkob Corona is located on Ganiki Planitia centered near latitude 50°N and longitude 202°. It consists of two subcircular components both 200 km by diameter and surrounded by a fresh-looking rim and radial and concentric lineaments extending over 200 km outwards of the rim. Some features can be traced as far as 350 km away from the rim. The eastern subcorona is nearly circular and the western subcorona with a heavily fractured and partly degraded rim is an older one.

Two major ridge belts, Pandrosos Dorsa in the east and Ahsonnutli Dorsa in the west border the corona longitudinally. Pandrosos Dorsa is cut by a satellite corona on the northeastern corner of Neyterkob. Ahsonnutli Dorsa branches and deflects slightly to form a subconcentric pattern. A ridge belt runs south from the Neyterkob through a faint circular feature, possibly a corona. Neyterkob cannot be located in the middle or at the junction of major ridge belts as other coronae in this area [3]. Instead, it is a rather distinct feature and perhaps induced ridge belts of its own.

Topographic data reveals a trough both outside and inside the coronal rim. The trough disappears in the north and southwest and instead, a wide topographic high can be seen extending across the corona from SW to NE. This bulge is characterized by long, narrow fractures connecting the corona to Razia Patera and Pandrosos Dorsa. Central plains of the eastern subcorona are slightly below the surrounding terrain.

Lava flows have covered areas inside and outside the corona destroying tectonic features. Flow fronts are best seen outside the southeastern rim, where flood-like radar-dark flows cover the earlier radar-bright flows. To the north of the corona small volcanic edifices and pits are located on NE-SW trending fractures. Markings of late volcanic activity are also found on the bottom of both of the components and the satellite corona.

The rim shows a well-preserved topography around the corona Radial grabens cut the rim where lineaments join nearby coronae or deformation belts to Neyterkob. The top of the rim rises about 2 km above the trough in the southeastern side. Morphology of the rim suggests two phases in the main activity included by minor volcanic events in both of the components or perhaps movements or scattering of the decreasing activity by time. A number of features indicate later modification of the rim by more global forces.

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Tectonic patterns of the corona components are different although similarities can also be found. Particularly near the rim, distinct tectonic units relate to lava flow units or topography. To the east the long concentric fractures are located on a slope caused by the flexure of the lithosphere. Wrinkle ridges are found near the rim forming two different patterns close together, one parallel to the rim and another inclined. More compressional features are located on the trough overlying an older radial/concentric fracture net. The area to the west of the corona is covered by a massive subradial ridges extending to the Ahsonnutli Dorsa. The pattern changes into a net between Razia Patera and Neyterkob. Wrinkle ridges and thrusts are found on narrow zones near the rim and on a wider zone extending to the northwest. Extensional features are concentrated on the slopes of the rim supporting the idea of deformation of the rim by horizontal forces. Young radial features include short grabens to the south and long narrow fractures mainly in the NE-SW direction and resembling dike swarms discussed by MacKenzie [4]. On the eastern side, compressional features are located on the trough while extension is marked by narrow grabens on a slope indicating lithospheric flexure.

Conclusions. Though the eastern corona is clearly younger, it is not a different formation just overlying the western one. Two phases in the main activity were followed by minor volcanic events. Flexural response of the lithosphere is clearly evident near the rim. Tectonic features related to the initial stage are nearly all destroyed because of volcanic and tectonic resurfacing. The central topographic rise may have formed by volcanic reworking in NE-SW direction. This could be favoured by the long narrow fractures if they are interpreted to be surface expressions of dikes. Tectonic features in different phases of the coronal formation are strongly related to topography and continuously destroyed and deformed by volcanic and later tectonic activity. Regional stresses have contributed to the deformation.

References: [1] Stofan E.R, Sharpton V.L., Schubert G., Baer G., Bindschadler D.L., Janes D.M. and Squyres S.W. (1992) JGR, 97, 13347-13378. [2] Squyres S.W. Janes D.M., Baer G., Bindschadler D.L., Schubert G., Sharpton V.L. and Stofan E.R. (1992) JGR, 97, 13611-13634. [3] Raitala J. and Kauhanen K. (1991) Earth, Moon and Planets, 53, 127-148. [4] MacKenzie D., MacKenzie J. M. and Saunders R. S. (1992) JGR, 97, 15977-15990

Figure. Magellan SAR image of Neyterkob Corona. Razia Patera is shown to the SW of Neyterkob.