**Introduction:** The Nepenthes region of Mars, located along the dichotomy boundary to the east of Isidis Planitia, is subdivided into two geomorphological units: the southernmost, Nepenthes Mensae, has a rough appearance, being formed by fretted terrain composed of knobs, mesas, breccias, and material produced by wasting of the dichotomy scarp; the northernmost, Nepenthes Planum, is smooth and gently undulating due to the presence of wrinkle ridges.

Distinct stratigraphic units characterize the region (Fig. 1): in the most recent published global map of Mars [1] Nepenthes Mensae is mapped as unit $HN_t$ (Hesperian and Noachian transition unit), while Nepenthes Planum is mapped as unit $eH_t$ (Early Hesperian transition unit), bound to the north by unit $lH_t$ (Late Hesperian transition unit). The units are described for their global properties in [1-3], with unit $HN_t$ generally older or gradational with $eH_t$, spanning the combined chronological extent of the Noachian and Hesperian stratigraphic periods [1].

![Fig. 1. Geographical and geological context of study region. The map was assembled using the on-line tools of the geospatial information system Java Mission-planning and Analysis for Remote Sensing (JMARS), from http://jmars.asu.edu. The geological unit layer is from [1], overlain with partial transparency on the system default Mars Orbiter Laser Altimeter (MOLA) shaded relief data layer. The final figure was prepared using a commercial image editor software. The white frame shows the extent of the study area.](image)

In a preliminary study of the region, I applied statistical methods to diameter and depth dimensions of impact craters to narrow the age-range of unit $HN_t$ relative to units $eH_t$ and $lH_t$ in Nepenthes. The work outlined here is a self-contained section of ongoing collaborative investigations (e.g., [4]) aimed at constraining the geologic and climatic history of the region.

**Data and Methods:** Using the open-source GIS package QGIS (http://qgis.osgeo.org/en/site/), I extracted from a published database of impact craters [5] the values of diameter and depth of 663 craters located in Nepenthes Mensae and Nepenthes Planum (study area: white frame in Fig. 1). I then subdivided the data by the geographic extent of stratigraphic units $HN_t$, $eH_t$ and $lH_t$, obtaining one subset of measured depth and diameter data for each unit. No additional filter was applied to the data, which were subsequently processed and statistically analysed using routines written in the open-source SciPy (http://www.scipy.org) software.

**Interpretation and Conclusions:** Preliminary analysis of the data indicated that most impact craters in the study area have not been subject to substantial erosion or infilling since emplacement. There are however noteworthy differences among the three geological units in regards to the modified craters. These differences can be interpreted in regards to the histories of modification of the craters, and by extension of the units to which they belong. Impact craters on unit $lH_t$ have been mostly modified by infilling. The crater statistics for $eH_t$ and $HN_t$ overlap, suggesting a combination of progressive wasting and infilling processes acted on the craters to modify their dimensions over comparable periods of time in both units.

A conservative working hypothesis to explain the statistical similarities of $eH_t$ and $HN_t$ is that some parts of the Mensae and the Planum may have experienced coeval resurfacing. Investigations using smaller data sets of impact crater data filtered for quality and location, together with interpretation of geomorphological characteristics of the craters and the units, are underway to obtain more precise statistical constraints, with the aim to ultimately help to clarify the relation between units $HN_t$ and $eH_t$ in the study region.