SUMMARY

Metamorphic processes can transform the organic matter in sedimentary rocks into structurally organized carbonaceous matter, in ideal conditions to graphite. In the centre of West Alpine arch, the metasedimentary rocks are rich in dispersed carbonaceous matter and were used in this thesis to specify the thermal range of metamorphism based on the structural state. Previous studies have used mainly the Raman spectrometers to determine the structural state of carbonaceous matter. Unfortunately this method doesn't allow *in-situ* analyses which, in addition to Earth studies, can be essential for studying other planetary bodies and moons of our solar system. As only the smallest and lightest instruments are required for analyses during potential planetary missions to Mars, it is important to verify that the small instruments are able to detect even the small concentrations of carbonaceous matter. Currently available miniature and portable Raman spectrometers have started to become more precise but are still not as precise as laboratory Raman microspectrometers.

This thesis is divided into two parts. First part aims to duplicate the results from previous studies by Raman microspectrometers in the West Alpine arch. Furthermore, the excitation laser wave length dependence of spectral signs in carbonaceous matter was tested. In the last part, two Raman spectrometers with red excitation lasers were used for comparison with laboratory Raman microspectrometers in order to qualify detection limits for assessing the structure state of carbonaceous matter.