The Yinshan orogen and the northern Ordos basin cross different tectonic units in China. It is not only a coupling belt of basins and mountains, but also a special area with strong and weak tectonic activities. So it is of great importance to know and understand the properties and geodynamical process in depth in this area.

In this study, we analyzed the latest highly precise geomagnetic anomaly data along the Yanchuan-Baotou-Mandula profile and area aeromagnetic anomaly data. These materials can provide us with important information about crystalline basement and tectonic division in this area. Based on previous researches and measuring the field samples collected by ourselves, we find that most of the strata have a weak magnetic, while the magnetic of Mesozoic strata and Wulashan group in upper Archeozoic strata are above the medium magnetic.

By analyzing the amplitude and shape of observed geomagnetic anomaly curve, we can see that there are significant differences among different tectonic units. It demonstrates that the orogenic zone have more complicated magnetic structure than the basin zone. We calculate the estimates of magnetic source locations in Euler deconvolution method.

Then we use wavelet multi-scale to decompose aeromagnetic anomaly and use Parker method to inverse the upper magnetic interface, which regarded to be as crystalline basement. We compare it with other results which are obtained by using other geophysical methods, such as Depth Seismic Sounding, gravity, drilling. Finally, we discuss the characteristics of crystalline basement and tectonic division in this area.