



PySCIs: a user friendly Python tool to quickly applying Small Circle methods

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Small Circle (SC) methods are common tools in paleomagnetic working on synfolding paleomagnetic components. These methods have a twofold applicability. On one hand, the Small Circle Intersection (SCI) method allows obtaining the local remagnetization direction and on the other the SCs can be used to reconstitute the attitude of the sedimentary beds at the moment of the remagnetization acquisition.

The bases of the SCI method are as follows. (i) The paleomagnetic direction for each site follows a path which draws a SC under progressive untinting of the beds; this SC links the paleomagnetic direction before and after the tectonic correction. (ii) Considering that the beds have been deformed only by tilting around the bedding strike, the remagnetization direction is placed upon the small circle of each site. (iii) The acquisition of the remagnetization was simultaneous for the analyzed rocks. Therefore, the remagnetization direction must to be placed upon the small circle for all sites and hence the all small circle must to intersect in one direction which corresponds with the remagnetization direction. Actually the method looks for the direction in the space closest to the set of SCs by means of A/n parameter (this is the sum of the angular distances between one direction and each SC normalized by the number of sites).

Once the remagnetization direction is known, it is possible to calculate the paleomagnetic direction upon each SC closest to the calculated remagnetization direction, called as Best Fit Direction (BFD). After that the paleodip of the bed (i.e. the dip of the bed at the moment of the remagnetization event) can be calculated for each site (the paleodip is the angle measured over the SC between the BFD and the paleomagnetic direction after the complete bedding correction) and perform a palinspastic reconstruction of a region.

We present pySCIs, a new python tool which allows applying this methodology in an easy way. The program has two different modules, pySCIs_calc.py and pySCIs_draw.py. The first one performs all calculations whereas the second one provides a graphical output. The input data are a comma delimited text file with the name of the sites, the in situ paleomagnetic directions and the attitude beds. After perform the calculations, pySCIs_calc.py export four text files: (i) one of them with all information regarding the paleomagnetic direction and the paleodip, (ii) other with the calculated remagnetization direction, (iii) a third one with the direction of the intersections between the small circles and (iv) the last one with a one degree grid with the values of A/n . The graphical output consist in four equal area projections, three of them with the SCs and the paleomagnetic direction in different stages (before and after the bedding correction and the BFD) and the last one is a contour plot of A/n and the intersection between the SCs.