data in structural geology, sedimentology, etc. and can be applied together with a fourth variable (time, thickness, etc.).

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Tectonic correction of linear data in plunging structures; a case study in the Cerbara magnetostratigraphic section (Italy)

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The restoration of linear data (paleomagnetic vectors, structural indicators, paleocurrent directions, etc.) observed in plunging structures to the (paleo-)horizontal has to be done in view of the geometry and kinematics. If the plunge is due to the acting of several deformation axes (most cases), simple bedding correction (BC; using the strike as the rotation axis for an angle equal to the dip) will generate an error. The error will be different for the different positions of the structure and this can be checked if a set of linear data distributed all around the geometry is available. A plot of the strike of the beds against the azimuth (declination) of their associated linear elements after BC (the so called "oroclinal bending diagram") will show a linear relationship for the whole data set: that is to say, an apparent and erroneous positive oroclinal bending (Fig. 1A). Once the source of error has been detected in such a way, and the structure orientation has been calculated from field data, the restoration should be performed considering the deformational history. Normally the plunge is removed under the assumption, that it was acquired by a tilting perpendicular to the azimuth of the structure axis. This operation certainly eliminates the strike-declination dependence (apparent oroclinity) but the supposition is not necessarily true and may also cause big errors.

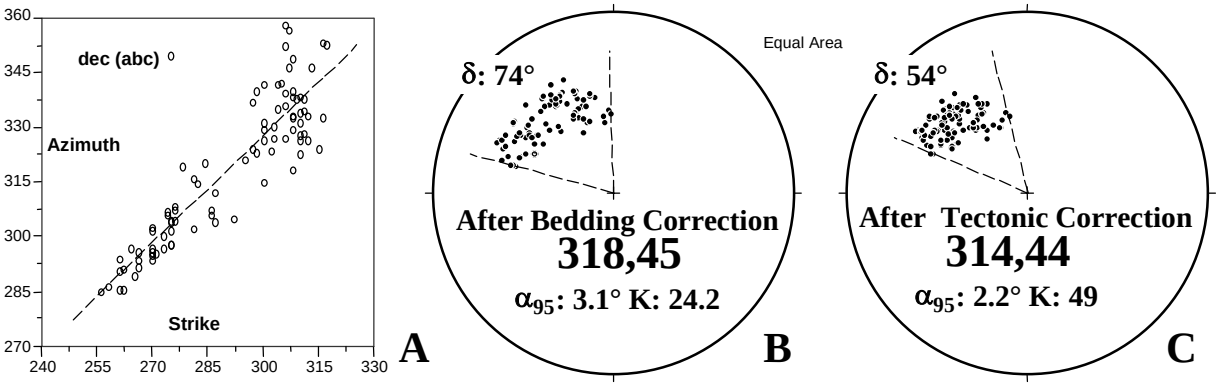

***Fig. 1**. Paleomagnetic data restoration in the Cerbara section. The BC and the tectonic correction differ substantially. The latter displays 22° less of dispersion and a much higher concentration parameter (K).*

The Cerbara section (Umbrian Apennines) represents a good example to check the restoration errors in such structures. This Cretaceous/Paleogene boundary was studied for magneto-stratigraphical dating and it is part of a 55° northwards plunging structure. The simple BC clearly shows (Fig. 1B) a conical-Binghamian scatter ("banana like" distribution). The conventional correction of the plunge gives a better Fisherian distribution (Fig. 1C). A further accurate correction based on a detailed field study should be done in the future. Field data will allow the characterization of the kinematics of this structure; that is to say, the relative orientation between folding and tilting axes, probably associated with syn-sedimentary movements.