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Stress fields and emplacement of dike swarms during Early Cretaceous rifting in Southern Brazil

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Early Cretaceous rifting of Gondwana in Southern Brazil was marked by the voluminous Paraná-Etendeka tholeiitic continental flood volcanism. Available geochronological data indicate that lava flow extrusion started at about 135 Ma, along NE-oriented lithospheric faults roughly parallel to the present-day course of the Paraná river. The magmatism migrated to southeast along the Ponta Grossa dike swarm between 134 and 132 Ma, and to the coastal regions of SE and S Brazil around 127-126 Ma, just before the Gondwana break-up. In these coastal regions two main mafic dike swarms were emplaced, the NE-SW-oriented Santos-Rio de Janeiro and the N-S-oriented Florianópolis, which together the Ponta Grossa swarm form a triple junction. With the continental break-up, the Ponta Grossa arm aborted and the two others evolved to the South Atlantic. Since dikes are emplaced orthogonally to the minimun principal stress, we carried out a field survey to measure dike orientations and to examine inelastic deformations along their borders in order to determine the stress field during the emplacement of dikes. Field data indicate that emplacement of dikes occurred under a NW-SE-oriented extension and a NE-SW-oriented shortening, suggesting respectively a left-lateral transtensional regime to the Santos-Rio de Janeiro and a right-lateral transtensional regime to the Florianópolis dike swarms. These results are in accordance with theoretical models and previous stress data obtained in other areas of Southeastern and Southern Brazil. (With financial support form FAPESP and CNPq, Brazil).