

THE PLATE TECTONICS REVOLUTION 30 YEARS ON: RETROSPECT AND PROSPECTS

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The modern revolution in the earth sciences is associated with the emergence of plate tectonics in the late 1960s. Plate theory marked the culmination of a half century of debates over crustal mobilism and drew together in a grand synthesis developments in many branches of the earth sciences. The widespread acceptance of plate theory, J. Tuzo Wilson forcefully argued in 1976, has transformed the earth sciences from a group of rather unimaginative studies based upon pedestrian interpretations of natural phenomena into a unified science that holds the promise of great intellectual and practical advances. Has this promise been fulfilled? The assumption that the crust is composed of a small number of rigid, non-deformable, mobile plates enabled a quantitative description of current geological processes and reconstructions of past plate interactions. Over the past 30 years, it could be argued with some justness, there has been a gradual shift from geology as an historical science to a more physical and quantitative one. The simple model of plate tectonics ca. 1970, for example in its depiction of a subduction zone or crust-mantle interaction, is easily grasped but has since undergone considerable refinement. Moreover, many structural geologists and others judge plate theory even in its current form to be of limited value in addressing questions of continental tectonics.