Chapter 2
General Aspects

Foliations, lineations and fractures can develop into inherited structures (Coussement et al. 1994). Basins/margins that underwent inheritance attain mature stage quite faster than those without inheritance (Holdsworth et al. 2013). Rock deformation tests confirmed that the faults/shears formed experimentally in anisotropic rocks disobey the common failure criteria, the Coulomb failure criterion and the Anderson's theory of faulting, for certain angular relations between the anisotropy and stress orientation. Those faults/shears rather follow/inherit anisotropies in such cases (like Donath 1961; Youash 1969; Shea and Kronenberg 1993; reviews by Paterson and Wong 2005). Thus, the geometries of faults that are inherited from prior structures within passive margins could be non-Andersonian (Brun and Autin 2013), e.g. steeply dipping reverse faults and low dipping normal faults are possible. Along with mantle plumes, inheritance work in non-unique ways in shaping individual rifts (Achauer and Masson 2002).

Inheritance/reactivation of faults along more than one direction (Montenat et al. 1986) is quite possible that can separate basins into segments (Branco Farnandez et al. 2010). Secondly, specific set of faults have been identified from rift basins to be product of inheritance (San'kov et al. 1999). Rifts and suture lines can parallel and inherit from basement discontinuity (de Graciansky et al. 2011). Suture zones in the basement can define trends of inherited rifts (Al-Amri 2013). Transfer zones can run parallel to the pre-existing fabrics (Withjack and Schlische 2005). Such a zone could have been inherited from fractures in older basement rocks (Montenat et al. 1986), or from basins/depressions in the pre-rift basement (Madritsch 2014). For example, complex transfer zones or 'graben shifts' related to conjugate fault sets in Pattani basin (Gulf of Thailand) were attributed to structural inheritance in two stages (Kornsawan and Morley 2002). Thus, a fracture in the basement can inherit/influence fault in the superjacent rocks under a stress regime. In a generalized language, therefore, one brittle structure can inherit another brittle structure. Transfer zones could be inherited form previous structures (Corti et al. 2002; Heffner 2013).

However, the rift axis need not always parallel weak inherited crustal lineaments (Beaumont and Ings 2012). Also note that a lineament might get reactivated multiple times (Copley et al. 2014). Extensional direction for rifting may not parallel planes of pre-existing weakness in the basement (Odegard 2005). The passive

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margin then cuts the trend of the mobile belt at high angles e.g. in the equatorial Atlantic conjugate margins of Africa and South America (see Sect. 4.2.3). The propagation direction of basins need not exactly parallel the inherited structure leading to transtension (Odegard 2005; Pereira et al. 2012; Gernigon et al. 2013; Holdsworth et al. 2013).

Inheritance in the context of extensional tectonics has been described by previous workers by a number of terms. Below we use Morley (1999a, b) for pre-existing fabrics in the shallow crustal domains, and Cloetingh et al. (1995) and Holdsworth et al. (2001) for those in the deeper realms in the context of lower crustal strength and mantle anisotropy.

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