

Redox sensitivity of blueschist and eclogite mineral equilibria

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Mineral equilibria influential to the formation of blueschist and eclogite are poorly resolved with regards to modern thermodynamic datasets. Phase equilibria modelling of examples of blueschist–eclogite from northern New Caledonia present petrological details important to defining the metamorphic facies and considering the effects of fluid release. Updated activity–composition models for phase equilibria modelling of amphiboles enables the resolution of the blueschist–eclogite–amphibolite facies triple junction in terms the stability of omphacite, garnet and the sodic–calcic amphibole solvus. The specifics of the facies transition are influenced by extensive variables of water content and redox budget. Lower water activities displace the stability of *sensu stricto* eclogite to lower- P , well outside of the P – T conditions of commonly preserved natural eclogites. Greater extensive oxygen expands the stability of clinozoisite, glaucophane–riebeckite, chloritoid, talc and aegirine-rich omphacite at the expense of garnet. The sensitivity of the P – T – X stability of hydrous phases is important for considering fluid and trace element liberation in subduction zones.