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# Geometry and kinematics of continental subduction inferred from 1D thermal modelling of prograde PT path

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High-pressure – low-temperature (HP-LT) metamorphic rocks that belong to the same orogen commonly show alignment of their peak pressure and related temperature within a PT diagram, defining a P/T ratio. Such P/T ratios are likely characteristic of the HP/LT metamorphic belts and seem to be related to the subduction velocities. Two parameters can be defined to characterize this linear relationship: the slope and the temperature at 10 kbar of the P/T alignment, respectively denoted $\Delta P/\Delta T$ and T@10kb. In the Aegean region for example, two metamorphic belts of different ages are well documented from north to south: the Cycladic blueschists formed around 40-45 Ma with peak PT data well aligned with a $\Delta P/\Delta T$ of 0.05 and T@10kb of 360 ˚C. The Cretan blueschists of Miocene age (25 Ma) gave a much larger $\Delta P/\Delta T$ of 0.08 with lower T@10 kb while the Peloponese blueschists of same age gave $\Delta P/\Delta T$ and T@10kb values similar to that of the Cyclades. The causes of spatial and temporal variation of P/T ratio remains poorly understood. In order to quantify the role of both velocity and dip angle of the subduction in defining P/T ratios, we undertake simple 1D modelling of thermal evolution of subducted continental margin. The results show that subduction dip angle controls the value of $\Delta P/\Delta T$, whereas the subduction velocity controls the temperature of the P/T alignment at 10 kb. From these results, it is possible to infer from natural PT data the subduction velocities and dip angles. The variations through time of the Aegean slab kinematics are discussed as follows.

Eocene subduction for Cycladic blueschist burial occurred at a rate of 1.5 cm/a, which is almost the convergence rate between Africa and Eurasia at this time. Same subduction velocity is found for the Miocene Peloponese blueschist burial. In opposite, subduction velocity during Micoene Cretan blueschist metamorphism is found to be 3 cm/a. The active southward roll back of the Aegean slab during Oligo-Miocene likely explains the larger subduction velocity for the Cretan HP/LT rocks. These results gave thus quantitative estimate of lateral variation of roll-back velocity during Miocene subduction.