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► **To cite this version:**

Sébastien Potel, Rafael Ferreiro Mählmann. K-white mica b cell dimension: a complementary clay mineral tool to decipher a polyphasic basin evolution. AIPEA – XVII INTERNATIONAL CLAY CONFERENCE, THE CLAY SCIENCE SOCIETY (TURKEY); THE CLAY MINERAL SOCIETY (USA); AIPEA, Jul 2022, Istanbul, Turkey. pp.251. hal-04295850

HAL Id: hal-04295850

<https://hal.science/hal-04295850v1>

Submitted on 23 Nov 2023

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XVII ICC
ISTANBUL 2022
25 -29 JULY



K-white mica b cell dimension: a complementary clay minerals tool to decipher polyphasic basin evolution

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Since the pioneer work of Sassi (1972) on the K-white mica b cell dimension BCD), the method has been used to characterize the factor pressure in meta-pelitic rocks. This method is used as an estimate of different pressure facies. Studies in the last two decades reached in low-grade metapelitic rocks. Studies in the last two decades have been carried out in different basins and meta-sedimentary rocks with poly-phase evolutions. It could be demonstrated that this method is less prone to resetting than the Kübler-Index (KI) or organic matter (OM) indices. Also, in supposed mono-phase metamorphic settings, the b cell method detected earlier higher-pressure events. A poly-phase history that KI values, the clay mineral reactions progress or OM evolution did not indicate.

Case studies conducted in New Caledonia in the SW Pacific (Potel et al., 2006), in the Vosges in the NE of France (Potel et al., 2016) and in the Montagne Noire in the S of France, using K-white micas BCD, have allowed to outlined poly-metamorphic evolution hitherto unknown. In New Caledonia an early K-white mica neof ormation at high-pressure conditions after a pluri-facies metamorphic evolution (late prograde temperature overprints) is preserved by K-white micas BCD. In the Vosges, The K-white mica BCD indicates the limit of the contact metamorphism halo of intrusion in contrast to exclusively burial and orogenic thermal patterns shown by e.g. index minerals like biotite or actinolite. To substantiate these findings, results concerning the evolution of the eastern part of the Montagne Noire will be presented. The Montagne Noire is a gneiss dome flanked by Paleozoic sediments. The K-white mica BCD was used to decipher the burial effect compared to the contact metamorphism on the Paleozoic sediments.

Sassi, F.P. (1972). The tetrahedral and geological significance of the b₀ values of potassic white micas in low-grade metamorphic rocks. An application to the Eastern Alps. *Tschermaks Mineralogische Petrographische Mitteilungen* 18, 105–113.

Potel, S., Ferreiro Mählmann, R., Stern, W.B., Mullis, J., Frey, M. (2006). Very low-grade metamorphic evolution of pelitic rocks under high-pressure/low-temperature conditions, NW New Caledonia (SW Pacific). *Journal of Petrology* 47, 991–1015.

Potel, S., Maison, T., Maillet, M., Sarr, A.C., Doublier, M.P., Trullenque, G., Ferreiro Mählmann, F. (2016). Reliability of very low-grade metamorphic methods to decipher basin evolution: case study from the Markstein basin (Southern Vosges, NE France). *Applied Clay Sciences*, DOI.10.1016/j.clay.2016.10.003.