Variation of the first Hilbert coefficients

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The set of the first (after the multiplicity) Hilbert coefficients of parameter ideals in a Noetherian local ring (R,m) codes for significant information about its structure. In joint work with S. Goto, J. Hong, K. Ozeki, T.T. Phuong, and W.V. Vasconcelos, we studied noteworthy properties such as that of Cohen=Macaulayness, Buchsbaumness, and of having finitely generated local cohomology. In this talk we give a brief overview of our main results and we present recent work on "variation". We study how the first Hilbert coefficients of parameter ideals with a common integral closure can vary. We also give estimations for the first two Hilbert coefficients $e_0(I)$ and $e_1(I)$ when the m-primary ideal I is enlarged (in the case of e_1 in the same integral closure class).