Around the characteristic cohomology for smoothable IDS

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The *characteristic cohomology* has recently been introduced by J. Damon. This notion is developed for the setup of *non-linear sections* $(X_f, 0) = (f^{-1}(Y), 0)$ induced by a map germ $f\colon (\mathbb{C}^p, 0) \to (\mathbb{C}^n, 0) \supset (Y, 0)$ for a fixed *model singularity* $(Y, 0)$. Roughly speaking, the question is how the (local) cohomology of $(Y, 0)$ contributes to the cohomology of $(X_f, 0)$ and its smoothing. Inspired by Damon's considerations we will pursue a similar approach for smoothable determinantal singularities $A\colon (\mathbb{C}^p, 0) \to (\mathbb{C}^{m\times n}, 0)$ (with $Y = M^s_{m,n} \subset \mathbb{C}^{m\times n}$ the set of matrices of rank $< s$) and their smoothings $M_A = \tilde{A}^{-1}(M^s_{m,n}) \cap B_\varepsilon$ induced from a *stabilization* $\tilde{A}\colon B_\varepsilon \to \mathbb{C}^{m\times n}$ of A. In this case, the image of $\tilde{A}$ meets only the stratum $V^{s-1}_{m,n} \subset M^s_{m,n}$ of matrices of rank $s-1$ and we shall see that $A^*\colon H^\bullet(V^{s-1}_{m,n}) \to H^\bullet(M_A)$ is non-trivial in many cases.