Let K be a non-Archimedean field with nontrivial discrete valuation whose ring of integers K° contains $\mathbf{C}$ and $\mathbf{C} \stackrel{\sim}{\to} \widetilde{K}$, and let Π be the subgroup of Galois group G of K which is the preimage of $\mathbf{Z}$ under the canonical isomorphism $G \stackrel{\sim}{\to} \widehat{\mathbf{Z}}$. I will describe a construction that associates to every special formal scheme $\mathfrak{X}$ over K° an exact functor $\Lambda^{\cdot} \mapsto R\Psi_\eta^h(\Lambda^{\cdot}_{\mathfrak{X}_\eta})$ from the derived category of Π-modules to the derived category of abelian Π-sheaves on the complex analytification $\mathfrak{X}_s^h$ of the closed fiber $\mathfrak{X}_s$ of $\mathfrak{X}$. This functor possesses many of the properties established in my previous work for the similar functor on complexes of discrete *torsion G-modules* and extends the latter. Furthermore, given a morphism of complex analytic germs $(X,x) \to (\mathbf{C},0)$, a scheme $\mathcal{Y}$ of finite type over $\mathcal{O}_{X,x}$, a subscheme $\mathcal{Z} \subset \mathcal{Y} \otimes_{\mathcal{O}_{X,x}} \mathbf{C}$, and a homomorphism $\mathcal{O}_{\mathbf{C},0} \to K^\circ$ defined by a generator of the maximal ideal of K°, the above functor associated to the formal completion $\widehat{\mathcal{Y}}_{/\mathcal{Z}}$ coincides with the restriction of the corresponding complex analytic vanishing cycles functor (from SGA7), associated to the analytification $\mathcal{Y}^h$ of $\mathcal{Y}$, to $\mathcal{Z}^h$. The construction allows one to define, for every compact strictly K-analytic space X, integral "étale" cohomology groups $H^q(\overline{X}, \mathbf{Z})$ of $\overline{X} = X \widehat{\otimes} \widehat{K^{\mathrm{a}}}$. These are finitely generated abelian groups provided with a quasi-unipotent action of Π and functorial in X, and they give rise to the étale l-adic cohomology groups of $\overline{X}$ and, if X is rig-smooth, to the de Rham cohomology groups of X.