Abstract. If Y is a diagram of spectra indexed by an arbitrary poset $\mathcal{C}$ together with a specified sub-poset $\mathcal{D}$, we define the *total cofibre* $\Gamma(Y)$ of Y as cofibre$(\mathrm{hocolim}_{\mathcal{D}}(Y) \longrightarrow \mathrm{hocolim}_{\mathcal{C}}(Y))$. We construct a comparison map $\hat{\Gamma}_Y \colon \mathrm{holim}_{\mathcal{C}} Y \longrightarrow \hom(Z, \hat{\Gamma}(Y))$ to a mapping spectrum of a fibrant replacement of $\Gamma(Y)$ where Z is a simplicial set obtained from $\mathcal{C}$ and $\mathcal{D}$, and characterise those poset pairs $\mathcal{D} \subset \mathcal{C}$ for which $\hat{\Gamma}_Y$ is a stable equivalence. The characterisation is given in terms of stable cohomotopy of spaces related to Z. For example, if $\mathcal{C}$ is a finite polytopal complex with $|\mathcal{C}| \cong B^m$ a ball with boundary sphere $|\mathcal{D}|$, then $|Z| \cong_{PL} S^m$, and $\hat{\Gamma}(Y)$ and $\mathrm{holim}_{\mathcal{C}}(Y)$ agree up to m-fold looping and up to stable equivalence. As an application of the general result we give a spectral sequence for $\pi_*(\Gamma(Y))$ with E_2-term involving higher derived inverse limits of $\pi_*(Y)$, generalising earlier constructions for space-valued diagrams indexed by the face lattice of a polytope.