This paper is dedicated to Professor Yum Tong Siu on the occasion of his 60th birthday.

ABSTRACT. In this paper, we study the holomorphic de Rham cohomology of a compact strongly pseudoconvex CR manifold X in  $\mathbb{C}^N$  with a transversal holomorphic  $S^1$ -action. The holomorphic de Rham cohomology is derived from the Kohn-Rossi cohomology and is particularly interesting when X is of real dimension three and the Kohn-Rossi cohomology is infinite dimensional. In Theorem A, we relate the holomorphic de Rham cohomology  $H_{h}^{k}(X)$  to the punctured local holomorphic de Rham cohomology at the singularity in the variety V which X bounds. In case X is of real codimension three in  $\mathbb{C}^{n+1}$ , we prove that  $H_h^{n-1}(X)$  and  $H_h^n(X)$  have the same dimension while all other  $H_h^k(X)$ , k > 0, vanish (Theorem B). If X is three-dimensional and V has at most rational singularities, we prove that  $H_h^1(X)$  and  $H_h^2(X)$  vanish (Theorem C). In case X is three-dimensional and N = 3, we obtain in Theorem D a complete characterization of the vanishing of the holomorphic de Rham cohomology of X.