There are basically two approaches to the theory of period functions for the modular group and its subgroups of finite index: one is just a generalization of the Eichler-Shimura- Manin theory of period functions for holomorphic modular forms. The other one uses the transfer operator for the geodesic flow on these modular surfaces and identifies the period functions as certain eigenfunctions of the analytically continued transfer operator $\mathcal{L}_\beta$ at $\Re\beta = \frac{1}{2}$ with eigenvalue $\rho = 1$. For possible applications of this theory to quantum chaos it would be interesting to extend it also to other groups especially to non-arithmetic ones, where exact results up to now are still rather rare. Since the Hecke triangle groups G_q, generated by $Sz = \frac{-1}{z}$ and $T_\lambda z = z + \lambda$, with $\lambda = \lambda_q = 2\cos\frac{\pi}{q}$, $q = 3, 4, 5, ..$ are arithmetic only for $q = 3, 4, 6$ and can be related like the modular group $G_3 = SL(2, \mathbb{Z})$ to some kind of continued fractons it is natural to consider in a next step the theory of period functions for these groups. In this talk I will discuss the Markov partition of the Rosen map $f_q : I_{\lambda_q} \to I_{\lambda_q}$ of the interval $I_{\lambda_q} = [\frac{-\lambda_q}{2}, \frac{\lambda_q}{2}]$, $\lambda_q = 2\cos\frac{\pi}{q}$ with $f_q(x) = \frac{1}{|x|} - \lfloor \frac{1}{|x|\lambda_q} + \frac{1}{2} \rfloor \lambda_q$, if $x \neq 0$ and $f_q(x) = 0$ for $x = 0$, which is well known to be closely related to the Hecke group G_q Its generalized Perron-Frobenius operator when acting on a Banach space of holomorphic functions is trace class and has a meromorphic Fredholm determinant. Analogous arguments as in the case of the modular group allows us to define a transfer operator $\mathcal{L}_\beta$ for the Hecke group G_q which has also nice spectral and analyticity properties. I will present numerical results which support our conjecture that the eigenfunctions of this transfer operator with eigenvalue $\rho = 1$ on the critical line $\Re\beta = \frac{1}{2}$ are indeed directly related to the Maass wave forms of the group G_q and hence also to its period functions.