Underwater Wireless Sensor Networks (UWSN) has attracted significant attention recently. One of the most important issues in these networks is the energy constraint. Battery power in UWSN is limited and usually batteries cannot be easily recharged or changed. Therefore energy saving in this type of networks is vital. Network life time can be estimated by estimating energy consumption of nodes. In this paper, first we propose an analytical model for energy consumption estimation in cluster based underwater wireless sensor networks using M/M/1 queuing model. To the best of our knowledge, this is the first analytical model that represents the underwater cluster head's behavior based on M/M/1 queuing model. We can use this model to investigate the network performance in terms of average energy consumption. Then, we propose an analytical scheme to reduce energy consumption of cluster head nodes by reducing number of transitions between the idle and active states of cluster head nodes based on the number of data packets in the queue. Our analytical model is suitable for delay-tolerant
aquatic applications. We validate our analytical model using simulations.

References


Index Terms
Keywords
Underwater Wireless Sensor Networks  M/m/1 Queuing Model  Energy Consumption Model