1163-42-85 **Christina Giannitsi***, cgiannitsi@gatech.edu, and **Michael Lacey**. *Averaging with the divisor function.* Preliminary report.

We shall discuss averages along the integers, normalized using the divisor function, and defined as

$$K_N f = \frac{1}{D(N)} \sum_{n \leq N} d(n)\, f(x-n),$$

where the normalizing factor is given by $D(N) = \sum_{n \leq N} d(n)$. These averages satisfy a uniform, scale free ℓ^p-improving estimate for $p \in (1,2)$, that is

$$\frac{1}{N^{1/p'}} \|K_N f\|_{\ell^{p'}} \lesssim \frac{1}{N^{1/p}} \|f\|_{\ell^p}, \qquad p' = \frac{p}{p-1}$$

as long as f is supported on a subinterval of $[0,N]$.

Moreover the associated maximal function $K^* f = \sup_N |K_N f|$ satisfies (p,p) sparse founds for $p \in (1,2)$. That implies that K^* is bounded on $\ell^p(w)$ for $p \in (1,\infty)$, for all weights w in the Muckenhoupt A_p class. (Received August 11, 2020)