$$F(a,b) = \frac{1}{\sqrt{a}} \int\limits_{-\infty}^{+\infty} f(t)\, \psi^* \left( \frac{t-b}{a} \right) dt$$

# Wavelets Transform Applications

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## Objective

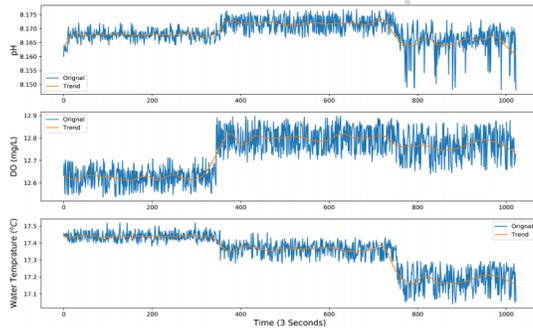- talk about briefly the applications of wavelet transforms

## 1. Wavelet transform aplications

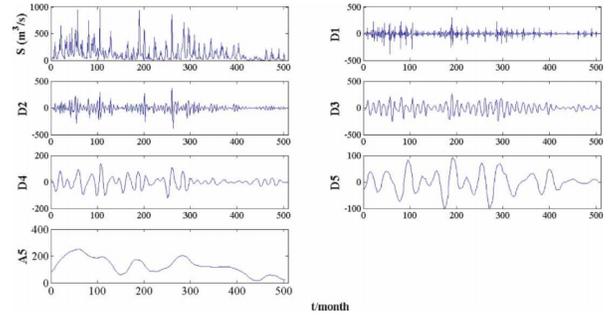Wavelets transform can be used to for stationary and nonstationary signals, including:

- noise removal from the signals
- trend analysis and forecating
- detection of abrupt discontinuities, changes, or abnormal behaviors, etc. and
- compression of large amounts of data
  - the new image compression standard called JPEG2000 is fully based on wavelets
- data encryption，i.e. secure the data

## 2. Examples
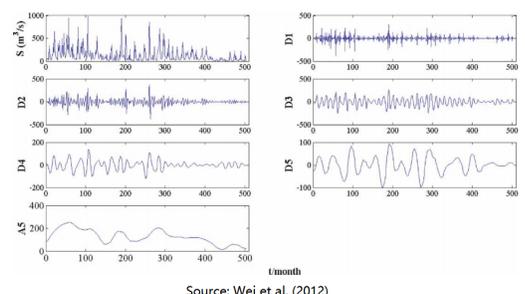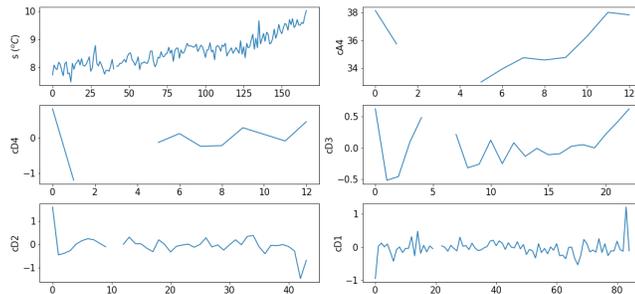
**(1) Noise removal and trend analysis**

Source: Zhao et al. (2020)

Source: Wei et al. (2012)

## (2) Abrupt discontinuities, and abnormal changes



Source: Wei et al. (2012)

## (3) Image Compression



Orginal (32.5kb)    Approximation (15.1kb)