MTRead

July 31, 2020

0.1 Acousonde MT files converter

We can read any MT file and convert acoustic data files into wav files, save Header information as csv and save the auxiliary information in a separate csv file.
First, we load the library. At the moment *acousondePy* is not yet available on through pip but will be very soon. Once this is fixed, the library can simply be loaded through *import acousondePy*.For now we read the functions from the source file.We also load *glob* the get a list of all available MT files.
In a next step we get a list of all *.MT* files in the data subdirectory:

[1]:
```
from MTRead import *
import glob
import matplotlib.pyplot as plt
plt.rcParams['figure.figsize'] = [10, 5]
#pattern for the MT files
path = "./data/"
pattern = '*.MT'
#get list of all auxilliary MT files
fns = glob.glob(path+pattern)
```

To read a single MT file we can use *MTread()*. Here a minimal example:

[2]:
```
p, HEADER, INFO  = MTread(fns[4])
```

```
21:13:50 - Found Data…
21:13:50 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'LoPower', 'stationcode': 'SB', 'title': 'TEST in
air and in water * path +22.5 dB * fc 2323 Hz', 'month': '07', 'day': '29',
'year': '2020', 'hours': '21', 'minutes': '23', 'seconds': '25', 'msec': '000',
'sampling_period': 0.000163580368, 'samplebits': 16, 'wordsize': 2, 'typemark':
'A', 'swapping': 'S', 'signing': 'S', 'caltype': 'C', 'calmin': -225453.67,
'calmax': 225446.79, 'calunits': 'mPa', 'recordsize': 512, 'sourcevers':
'2.6.2', 'sourcesn': 'B003A041'}
21:13:50 - Getting Meta data…
21:13:50 - Reading Data…
21:13:51 - Returning data…
```

This gives us access to the contained data:

[3]:
```
p
```

[3]:
```
array([-197271.96123125,    6543.16544274,    9790.66703914, …,
          12123.08873655,   12116.20843656,   12088.68723659])
```

The Header indormation:

[4]:
```
HEADER
```

[4]:
```
{'totalhdrs': 1,
 'abbrev   ': 'LoPower',
 'stationcode': 'SB',
 'title': 'TEST in air and in water * path +22.5 dB * fc 2323 Hz',
 'month': '07',
 'day': '29',
 'year': '2020',
 'hours': '21',
 'minutes': '23',
 'seconds': '25',
 'msec': '000',
 'sampling_period': 0.000163580368,
 'samplebits': 16,
 'wordsize': 2,
 'typemark': 'A',
 'swapping': 'S',
 'signing': 'S',
 'caltype': 'C',
 'calmin': -225453.67,
 'calmax': 225446.79,
 'calunits': 'mPa',
 'recordsize': 512,
 'sourcevers': '2.6.2',
 'sourcesn': 'B003A041'}
```

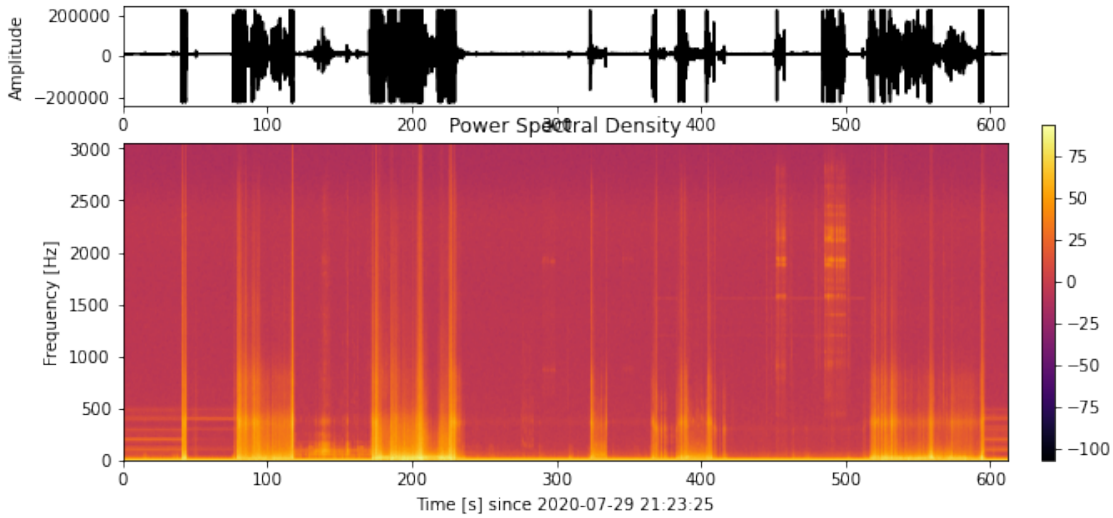
and the file info:

[5]:
```
INFO
```

[5]:
```
{'filename': './data\\SBS00006.MT',
 'filesize': 7471104,
 'srate': 6113.203022015454,
 'when': datetime.datetime(2020, 7, 29, 21, 23, 25),
 'datenumber': 737635.0,
 'whenC': datetime.datetime(2020, 7, 29, 21, 23, 25),
 'nsamp': 3735296,
 'seconds': 611.021094268928}
```

Currently we can also have a look at the spectrogram:

[8]:
```
Pxx, freqs, bins, im =spec_plot(p,HEADER,INFO)
```



Or we can read and convert all the files:

[7]:
```
read_multiple_MT(fns, op=path + 'output/')
```

```
21:13:52 - Found Data…
21:13:52 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'Accel/X', 'stationcode': 'SB', 'title': 'TEST in
air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21',
'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.01,
'samplebits': 10, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing':
'S', 'caltype': 'C', 'calmin': -2000.0, 'calmax': 1996.09375, 'calunits': 'mg',
'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:52 - Getting Meta data…
21:13:52 - Reading Data…
21:13:52 - Returning data…
21:13:52 - Found Data…
21:13:52 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'Accel/Y', 'stationcode': 'SB', 'title': 'TEST in
air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21',
'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.01,
'samplebits': 10, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing':
'S', 'caltype': 'C', 'calmin': -2000.0, 'calmax': 1996.09375, 'calunits': 'mg',
'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:52 - Getting Meta data…
21:13:52 - Reading Data…
21:13:52 - Returning data…
21:13:52 - Found Data…
21:13:52 - Getting Header information…
```

{'totalhdrs': 1, 'abbrev   ': 'Accel/Z', 'stationcode': 'SB', 'title': 'TEST in air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21', 'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.01, 'samplebits': 10, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing': 'S', 'caltype': 'C', 'calmin': -2000.0, 'calmax': 1996.09375, 'calunits': 'mg', 'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:52 - Getting Meta data…
21:13:52 - Reading Data…
21:13:52 - Returning data…
21:13:52 - Found Data…
21:13:52 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'Press', 'stationcode': 'SB', 'title': 'TEST in air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21', 'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.1, 'samplebits': 16, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing': 'U', 'caltype': 'C', 'calmin': -123.617562, 'calmax': 3488.1487, 'calunits': 'dbar', 'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:52 - Getting Meta data…
21:13:52 - Reading Data…
21:13:52 - Returning data…
21:13:52 - Found Data…
21:13:52 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'LoPower', 'stationcode': 'SB', 'title': 'TEST in air and in water * path +22.5 dB * fc 2323 Hz', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21', 'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.000163580368, 'samplebits': 16, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing': 'S', 'caltype': 'C', 'calmin': -225453.67, 'calmax': 225446.79, 'calunits': 'mPa', 'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:52 - Getting Meta data…
21:13:52 - Reading Data…
21:13:53 - Returning data…
21:13:53 - Saving wav file…TEST in air and in water * path +22.5 dB * fc 2323 Hz
21:13:53 - Found Data…
21:13:53 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'Temp', 'stationcode': 'SB', 'title': 'TEST in air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21', 'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.1, 'samplebits': 16, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing': 'U', 'caltype': 'C', 'calmin': -20.0001632, 'calmax': 68.9701528, 'calunits': 'C', 'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:53 - Getting Meta data…
21:13:53 - Reading Data…
21:13:53 - Returning data…
21:13:53 - Found Data…
21:13:53 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'Mag/X', 'stationcode': 'SB', 'title': 'TEST in

air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21',
'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.1,
'samplebits': 16, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing':
'S', 'caltype': 'C', 'calmin': -15624.7654, 'calmax': 15624.28861, 'calunits':
'mG', 'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:53 - Getting Meta data…
21:13:53 - Reading Data…
21:13:53 - Returning data…
21:13:53 - Found Data…
21:13:53 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'Mag/Y', 'stationcode': 'SB', 'title': 'TEST in
air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21',
'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.1,
'samplebits': 16, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing':
'S', 'caltype': 'C', 'calmin': -15455.0272, 'calmax': 15454.55555, 'calunits':
'mG', 'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:53 - Getting Meta data…
21:13:53 - Reading Data…
21:13:53 - Returning data…
21:13:53 - Found Data…
21:13:53 - Getting Header information…
{'totalhdrs': 1, 'abbrev   ': 'Mag/Z', 'stationcode': 'SB', 'title': 'TEST in
air and in water', 'month': '07', 'day': '29', 'year': '2020', 'hours': '21',
'minutes': '23', 'seconds': '25', 'msec': '000', 'sampling_period': 0.1,
'samplebits': 16, 'wordsize': 2, 'typemark': 'A', 'swapping': 'S', 'signing':
'S', 'caltype': 'C', 'calmin': -14441.513, 'calmax': 14441.07224, 'calunits':
'mG', 'recordsize': 512, 'sourcevers': '2.6.2', 'sourcesn': 'B003A041'}
21:13:53 - Getting Meta data…
21:13:53 - Reading Data…
21:13:53 - Returning data…
21:13:53: Reshaping data to get one column for each dataset