

Quant  
PointMap tools  
User Guide

## 1) General Introduction :

### **Appearance:**

- The point cloud indicates the degree of correlation between two or more linked variables. Each unit represents a point in the cloud. With the **Quant PointMap**, we can see that each point are displaying different delta depth values (Bid Depth - Ask Depth)

### **The values on both axes are numeric :**

- The computer positions data as paired sets of X and Y. Each point is then positionned according to two values. Points are the same size, regardless of their value, and are displayed at irregular intervals. Therefore, these printed points on the **Quant PointMap** are set in different colors, regarding the way that their delta depth value is calculated. The abscissa (horizontal X-axis) increases from left to right while the Y-axis (vertical Y-axis) increases from bottom to top. As the values increase, the points move from the lower left to the upper right, in theory.
- A regression line closest to all points can be plotted to show the strength and direction of the relationship between the variables. The closer the points are, the greater the correlation.

### **Positive correlation :**

- Simultaneous increase of the two parameters (X and Y evolve in the same direction). The strip of points goes from the lower left to the upper right.

### **Negative correlation:**

- X and Y evolve in the opposite direction. The point band goes from the upper left to the lower right.

### **Null correlation:**

- The points of the cloud are scattered.

**Note:** Correlation does not imply causality. A relationship between two parameters may be the consequence of a third causal factor. (CMMA value for example)

### **Usage:**

- Commonly used to indicate mathematically a direction of data and/or to give the state of data.

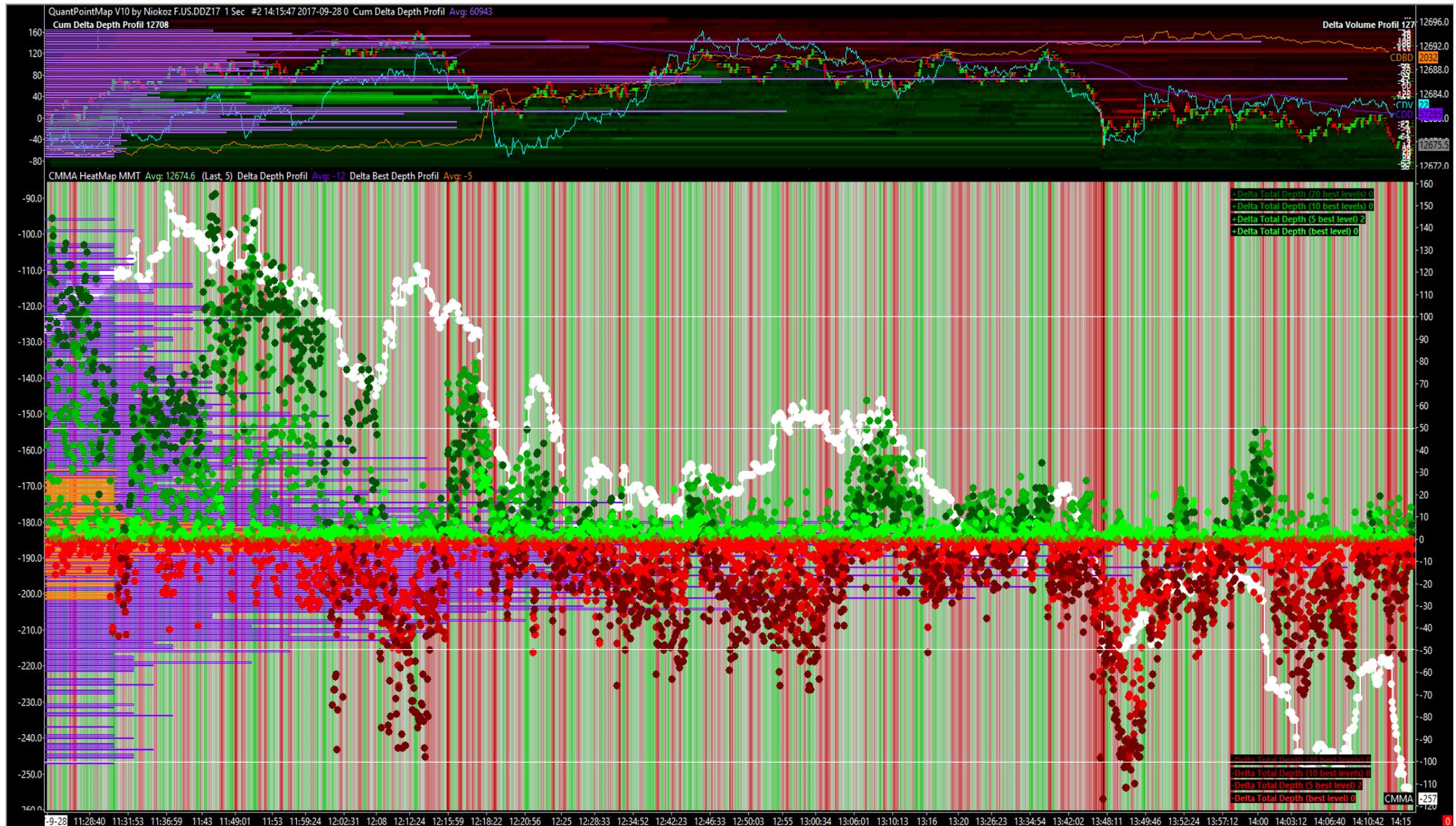
### **Design:**

- Generally very sober, the points are mostly represented by small circles or squares, filled or empty.

### **Synonyms for scatter plot:**

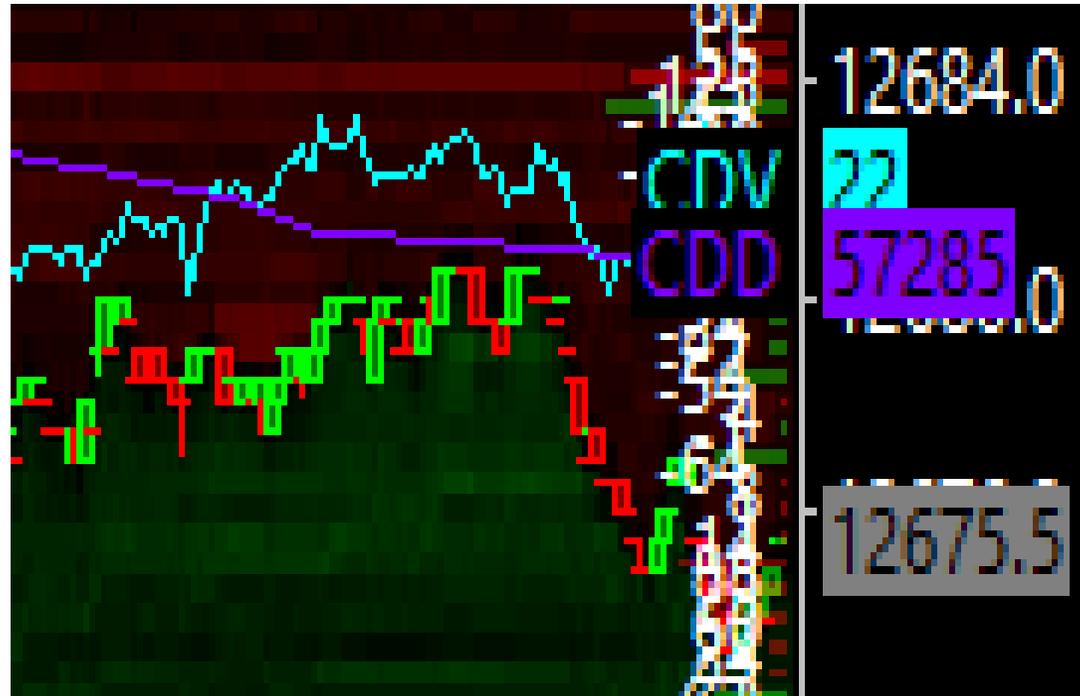
- Correlation graph, scatter plot. Cloud of dispersion is an Anglicism.

## 2) Describe of each features :



As you can notice on the screenshot, there are many informations and data that are displayed on this tool but finally only 2 main regions :

On the first region :

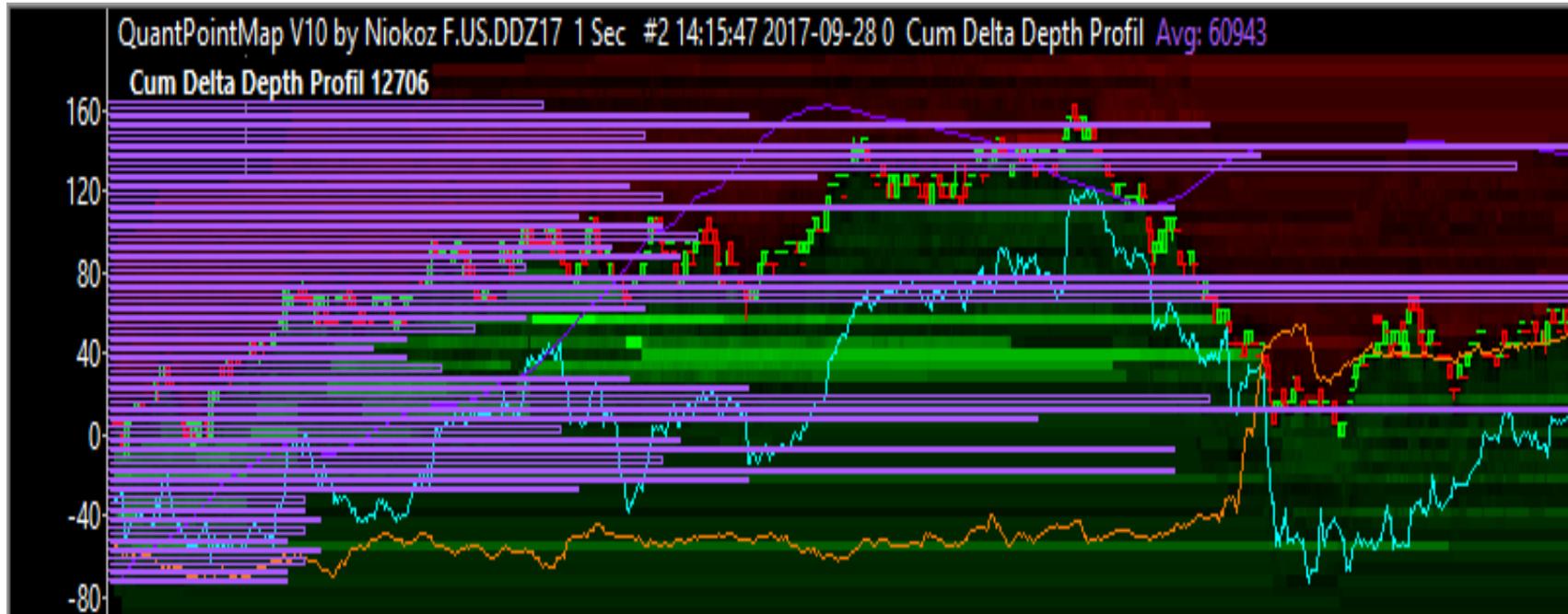


A) We can see the **price action** in candle stick bar with the **CDV line in blue** (cumulative delta volume value), the **CDD line in purple** (cumulative delta depth value) and the **CDBD line in orange** (cumulative delta best depth value) which are both of them overlaid directly on the price chart.

- Under this price action candle bar, we can see the **orderbook heatmap** which is showing the heatmap of the bid and the offer side of the orderbook for each price level. At the extreme right side of this part, you have the **delta volume value for each level** (positive or negative value) and the **price bar**. The delta volume value per price is calculated as follow : "Ask Volume bought - Bid Volume sold" cumulated.
- Also when you have a positive delta volume value on a X price level, it means there were more bought market orders filled, than sold market orders filled on this X price level. So it means the liquidity provider (official market maker) is (or was) probably bullish on this price level. He has a buy inventory opened on this price level, or he has buy back his last sell existing inventory to exit his position.

**B)** We can also notice a **purple profile** on the left side of this first region :

- This **purple profile** is a profil which is based on the liquidity. To be more precise, we can say that this purple profile is a profile which is based on the delta depth value cumulated (calculated with the 20 best bid and the 20 best offer levels).
- At the left side of this profile, you have a **value scale** which gives you the amount of this **delta depth value**. This profile will show you how the delta depth value was "distributed", by the time, and by the price.
- This **cumulative delta depth profile** is strictly overlayed with the price action chart : you can plot with this some very good price key levels for your trading.
- A **peak** of this profile is showing you a delta depth value which has rested a long time and/or which has been printed/registered a lot.
- A **valley** of this profile is showing you a delta depth value which was here not often. It could be an "exceptionnal value" or "anormal" value.

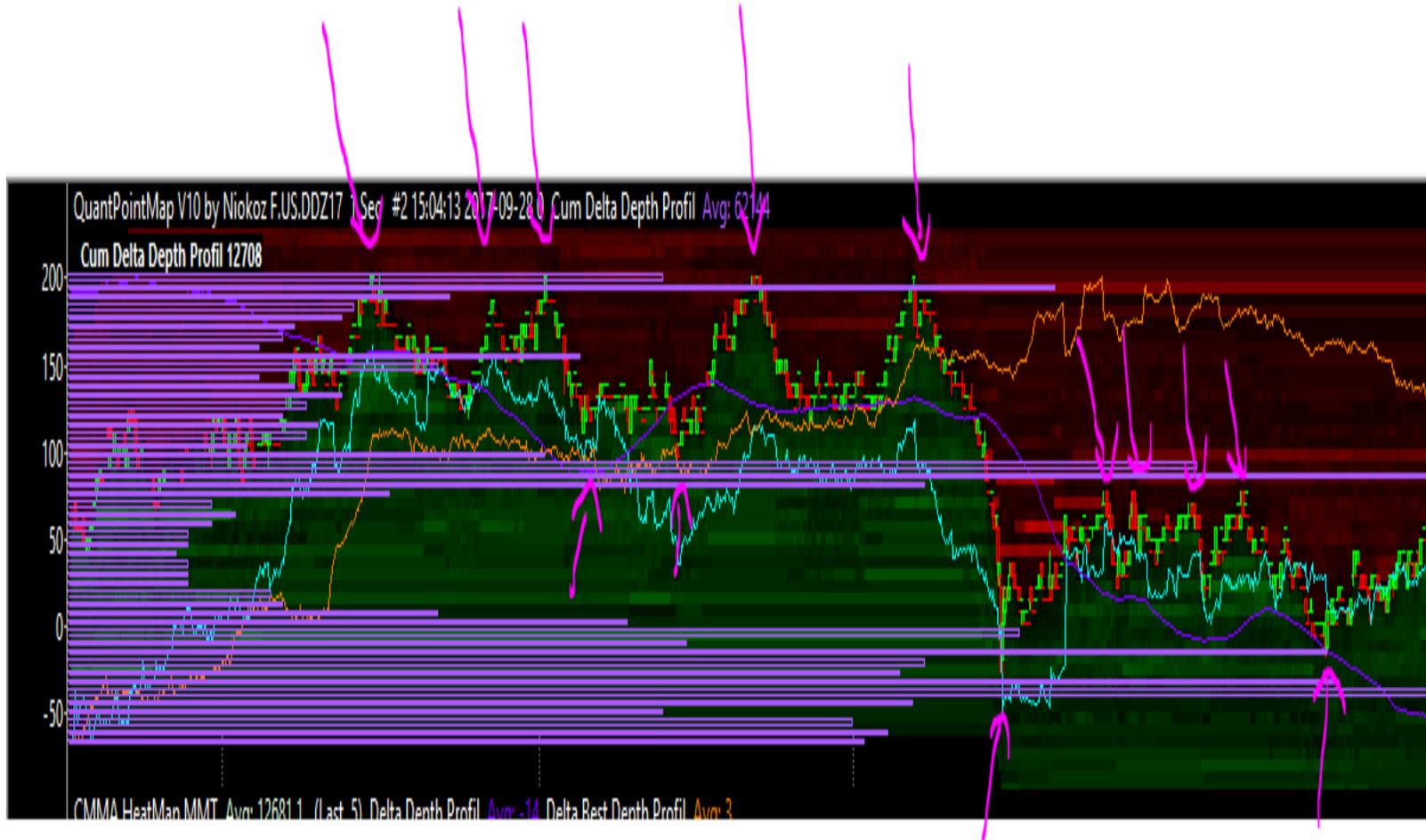


- So basically, you can use it very easily. You can use these peak/valley key areas to define and to match these key values with the price area which is associated. These peak/valley key areas are very often some very good and powerfull support/resistance price as you can see on this example

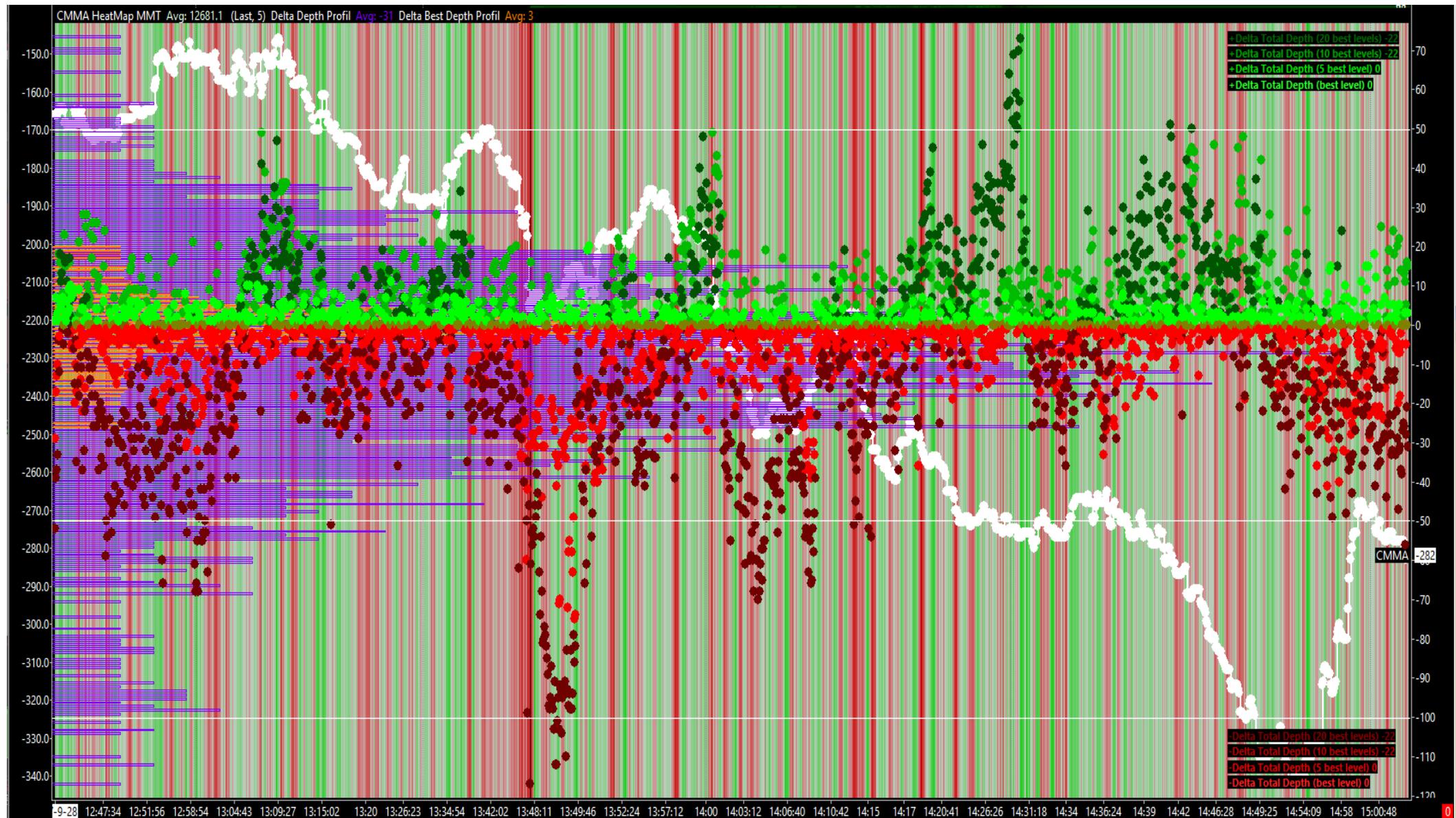
On this example, in only two hours, we have more than 15 favorable contacts of the price which has reached the profil peak. It's a very well rigged market. It's sometimes matching almost perfectly with the price action and it's showing that these price key levels (support/resistance) are built by the limit orders manipulation from the orderbook because as we just saw before, this **purple profile** is only based on the three thing :

- The **price**
- The **time**
- The **liquidity**

When you track a key price level from this **purple profile**, it's only coming from the **orderbook data** and not from the volume or other thing. 100% orders book which means there were 100% market making side price levels.



C) We also can watch the second region :



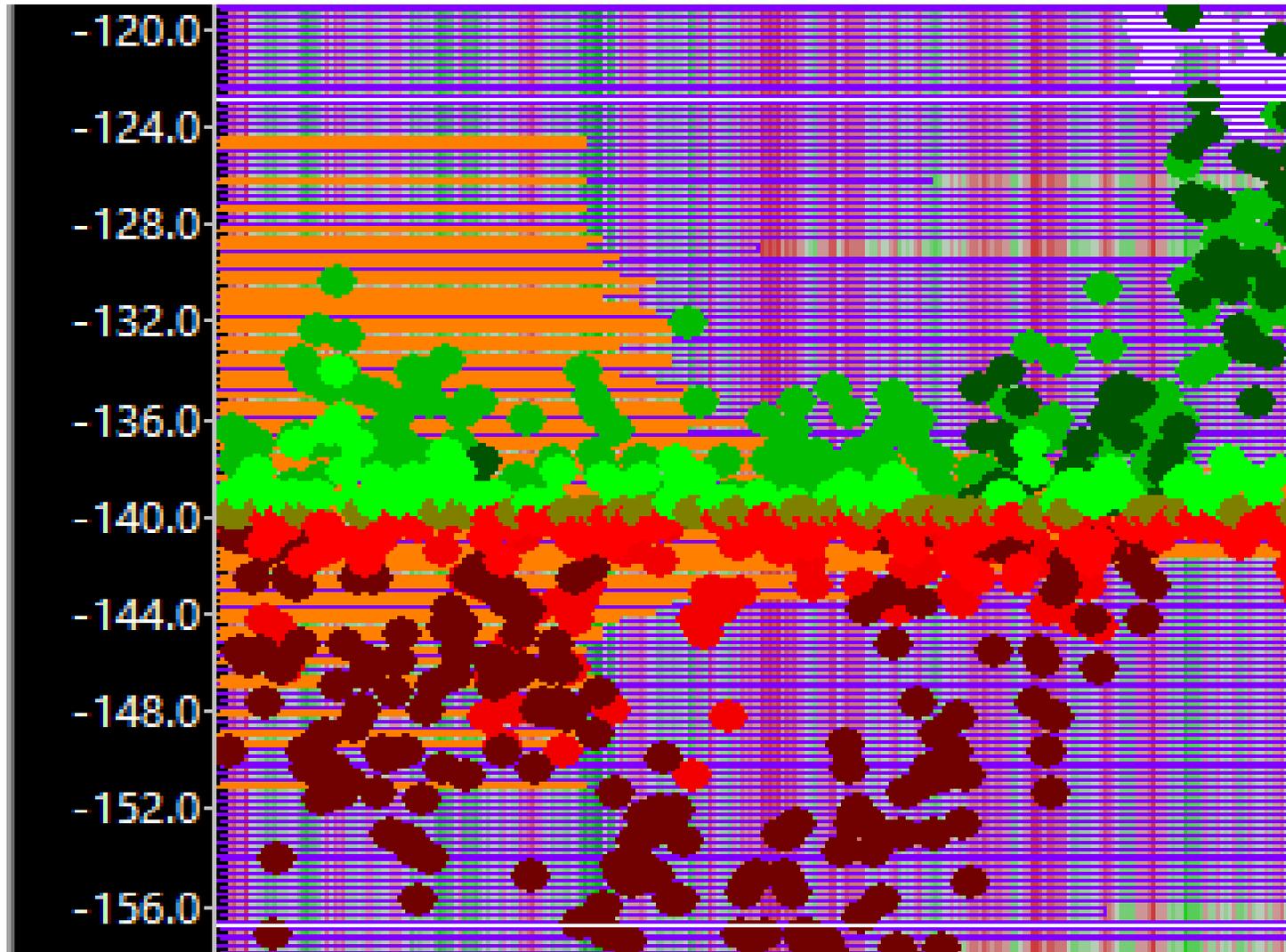
On this second region you can notice few information displayed differently :

- A **purple profile** for the delta depth value :



- This **purple profile** is calculated with the **delta depth value** (from the orderbook) but not cumulated. It's showing how each **delta depth value** has been printed/distributed by the time.
- This **purple profile** is matching with the dark green/red points.

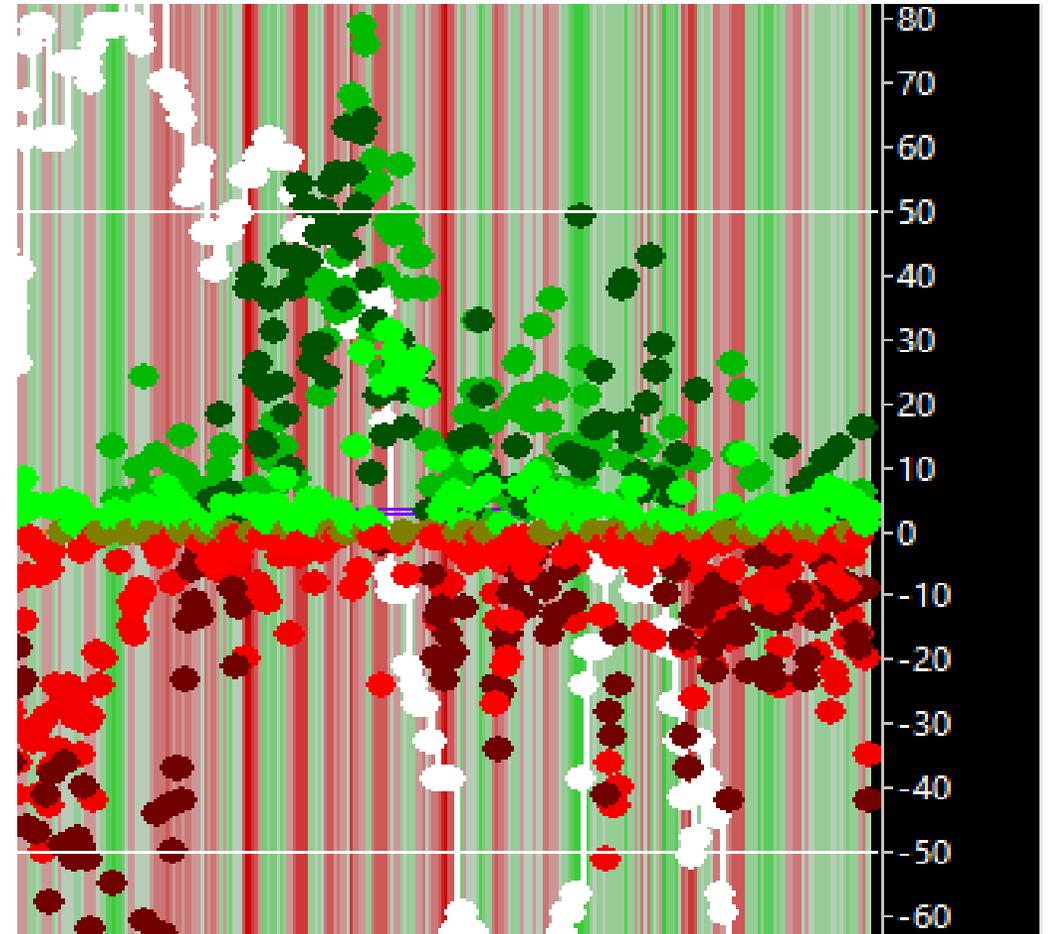
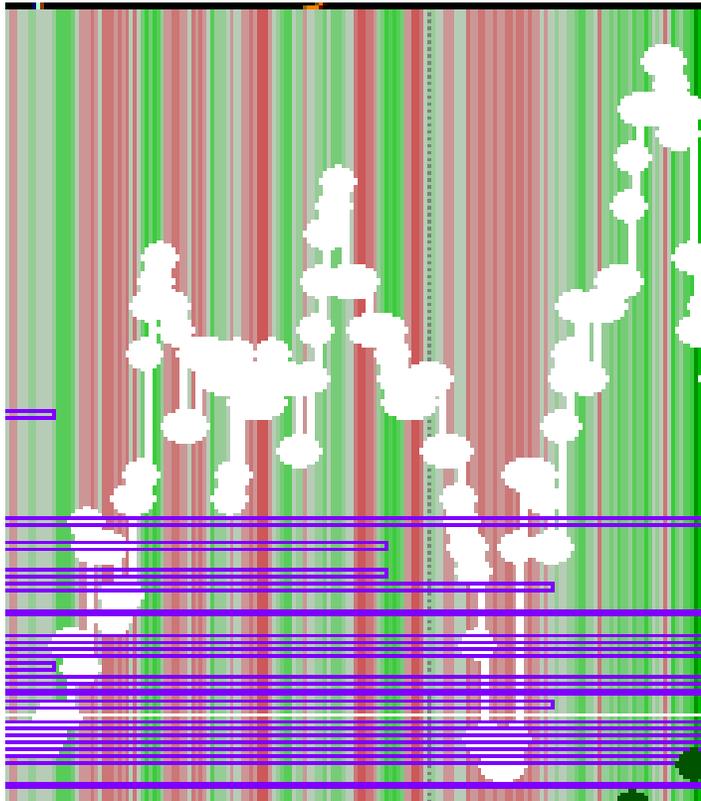
A **orange profile** for the delta best depth value :



- This **orange profile** is calculated with the **delta best depth value** (from the orderbook) but not cumulated and only for the best bid and the best offer.
- This profile is matching with the very light green/red point (which has been stored for all **delta best depth printed** from the orderbook)

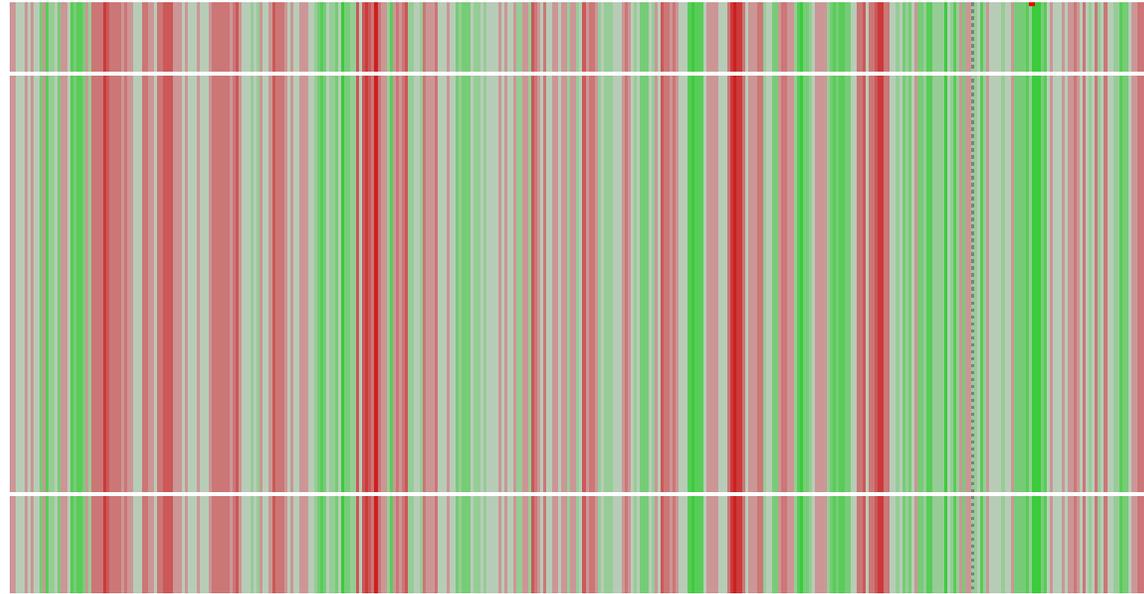
A **CMMA white point line** for the market making aggressivity measure:

- This **CMMA value** is shown with some point into the heatmap, and all of these white points are aligned to draw a white line into it. This CMMA value line is growing by the time and overlaid into its own heatmap. As you know this **CMMA white line** is usefull to define how the market maker is filling the orderflow (normaly or anomaly) :
  - The **delta depth point** calculated with the best bid/offer
  - The **delta depth point** calculated with the 5 best bid/offer
  - The **delta depth point** calculated with the 10 best bid/offer
  - The **delta depth point** calculated with the 20 best bid/offer



\* **Note** : These green/red points/dot are showing a delta depth dispersion chart and the color logic method is made depending on the legends of the panel.

The **CMMA heatmap** in background :



On the background of this second region, you can watch a heatmap. This heatmap is not based on the liquidity, neither on the price or the volume, but based on the **CMMA value** (market making aggressivity value).

Remember the **Market Making Aggressivity** concept :

- On the financial markets, especially on the futures market, we have a lot of transparency regarding the data access. Therefore, even if almost everybody can get the **DOM** or the **Time and Sales** windows to receive these market data, it appears that is very difficult to exploit these market depth & sales datas for 2 main reasons : the first one is that the market activities orderflow and the market making activities are usually too fast to be clearly visible with your humain brain only and it's almost all the time very confused.
- In addition of that, the second reason is we can notice the market orders flow is usually very randomed and we can not really predict if Mister X or if Miss Y will buy or sell an instrument at anytime. It's usually unpredictable (except on few market configuration)
- That's for the context. Now on this context, we can ask ourselves : how can we do to have a clear measure of these market depth data and volume data both at the same time if we are not a fast robot ?

**A key question to answer to this issue is :**

**How much does it cost** to move the price higher/lower? (in term of number of contract)

To define that i have built the MMA value which is calculated as follow :

- **MMA = Uptick Volume - Ask Volume**

Keep in mind :

- **Ask Volume** = Buy market orders bought (filled)
- **Bid Volume** = Sell market orders sold (filled)
- **Uptick Volume** = Market orders (bought or sold) which have pushed the price higher than the last traded price and/or than the previous best offer.
- **Downtick Volume** = Market orders (bought or sold) which have pushed the price lower than the last traded price and/or than the previous best bid.
- **Total Volume** = Ask Volume + Bid Volume
- **Total Volume** = Uptick Volume + Downtick Volume

It means that :

- **Ask Volume + Bid Volume = Uptick Volume + Downtick Volume.**

**\*Note :** in the economic theory, when we have buy market orders which are lifting the offer to be filled, it usually moves or doesn't move the price higher. At the opposite, when we have sell market orders which are hitting the bid to be filled, it usually moves or doesn't move the price lower. It is the normal theory. Therefore, in the financial market reality, it's a little different : we can notice that some Buy and Sell market orders filled seem to be filled anomaly.

In fact, we see that we have for example some buy market orders which have downticked the price lower and we have also some sell market orders which has upticked the price higher.

So basically, we can define :

- **Buy market orders** could move the price higher, lower, or be filled at the same last traded price
- **Sell market orders** could move the price higher, lower, or don't move it.

Also, by doing a comparison between the Buy market orders (bought) with the uptick volume, and between the sell market orders (sold) with the downtick volume, we can measure exactly how many contract has been filled "anomaly".

It's very important to plot that because, when you are able to measure these MMA value, you are able to define in which measure the market execution is rigged by using the price data, the volume data, and the market depth data, both of them, and at the same time.

The MMA value is very important because this value will show you a kind of measure of how the market is rigged (regarding the way that the market orders has been filled by the market maker).

- When you have a **positive MMA value**, it means there have been more upticks volume filled than buy market orders wanted initially.
- When you have a **negative MMA value**, it means there have been more downticks volume filled than sell market orders wanted initially.

When you see for example, a price action which is going down but with a MMA value or a CMMA value which is spiking up, you know that even if the price action is going down, you have probably a market maker which is fighting against the market orders flow.

He is fighting against the market orders flow by executing some sell market orders at a better price (higher) than the previous best bid or by executing some buy market orders at a better price (lower) than the previous best offer. It's called "**positive slippage**".

And at the opposit, you can see that a buy market orders could be filled higher than the previous best offer, and you can see that a sell market orders could be filled lower than the previous best bid. It's called "**negative slippage**".

#### More details :

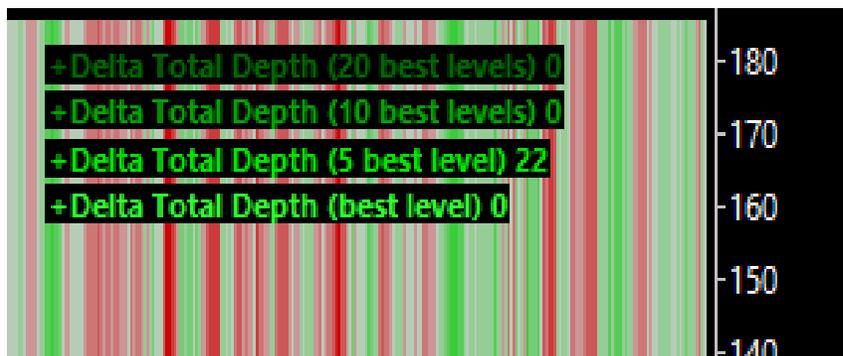
In fact, it's not the buy market orders filled anomaly which is pushing the price lower, and it's not really the sell market orders filled anomaly which is pushing the price higher.

We can say that, but it's not really fair to say that like that technically. Because, what we see is that it is the market maker who is able to use a short time interval to modify the depth structure (after he has seen the nature of this market orders flow which wanted to be filled). Also, it is well the market maker with their add/remove limit orders process from the orderbook, who is changing the execution price for the market orders flow, just by analyzing it so fast and by reacting and changing so fast his depth structure.

Finally we see these HFT market making algorithms are able to define almost when they want, at which price they will fill a market orders. Just because they have got a space time of few milli seconds that they are able to use to work on the orderbook (analyzing, and reacting with their limit orders).

Their goal is to have a good control of the auction and the price action to push the price higher/lower where they have some interest or where they want to re evaluate the auction. It's an endless game. A market making game.

The color text legend in green and red on the bottom/top :



### 3) Key Trading configurations :

In our trading, there are few different and good ways to exploit the **Quant PointMap** to make some good scalping decisions and we will see the main interesting market configuration to do that :

#### A) The bullish/bearish distortion :

When it is a bearish distortion :

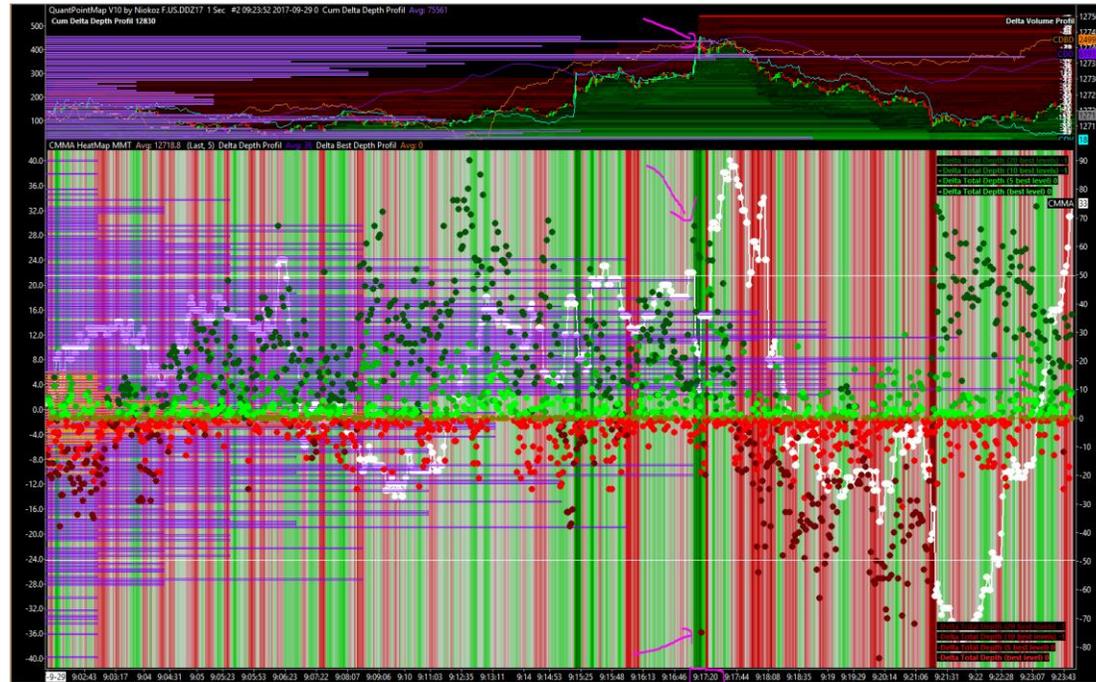
- The **price** has been pushed higher strongly (price trend visible by every body)
- The **price** has extended his daily range (stop loss hunting logic)
- Some **large volume** has been bought quickly (market orders flow panic/interest) with a little price impact (market making absorption)
- You saw a **big spread** between two consecutive Delta Depth points

This big spread between these two consecutive Delta Depth point is showing you a green point above an average key value which is followed by a red point below an average key value.

It's what we call a delta depth distortion or a delta depth dispersion : it is usually seen when you have the market maker who is building the price bottom or the price top and it's very useful to make the trouble into the head of the other market participants/algos and slow down their data feed.

When it's a bullish distortion, it's the same logic but on the other side.

Let's have a look with this example : (bearish distortion on the FDAX at 9.17 AM CET)



On this example, we can see this big spread that we are looking for between two consecutive green/red points : one is printed above the +70 Delta Depth value and the other is printed below the -80 Delta Depth value in only few seconds. Two extreme delta depth values printed at the opposite very fastly.

What does it mean? It means that in only few seconds, we have seen a very large spread between two consecutive delta depth values. It means the market maker is trying to trap one side of the auction by building two fake imbalances on the depth structure. It's only useful to make the other participants confused and slow down their feed and their reaction time.

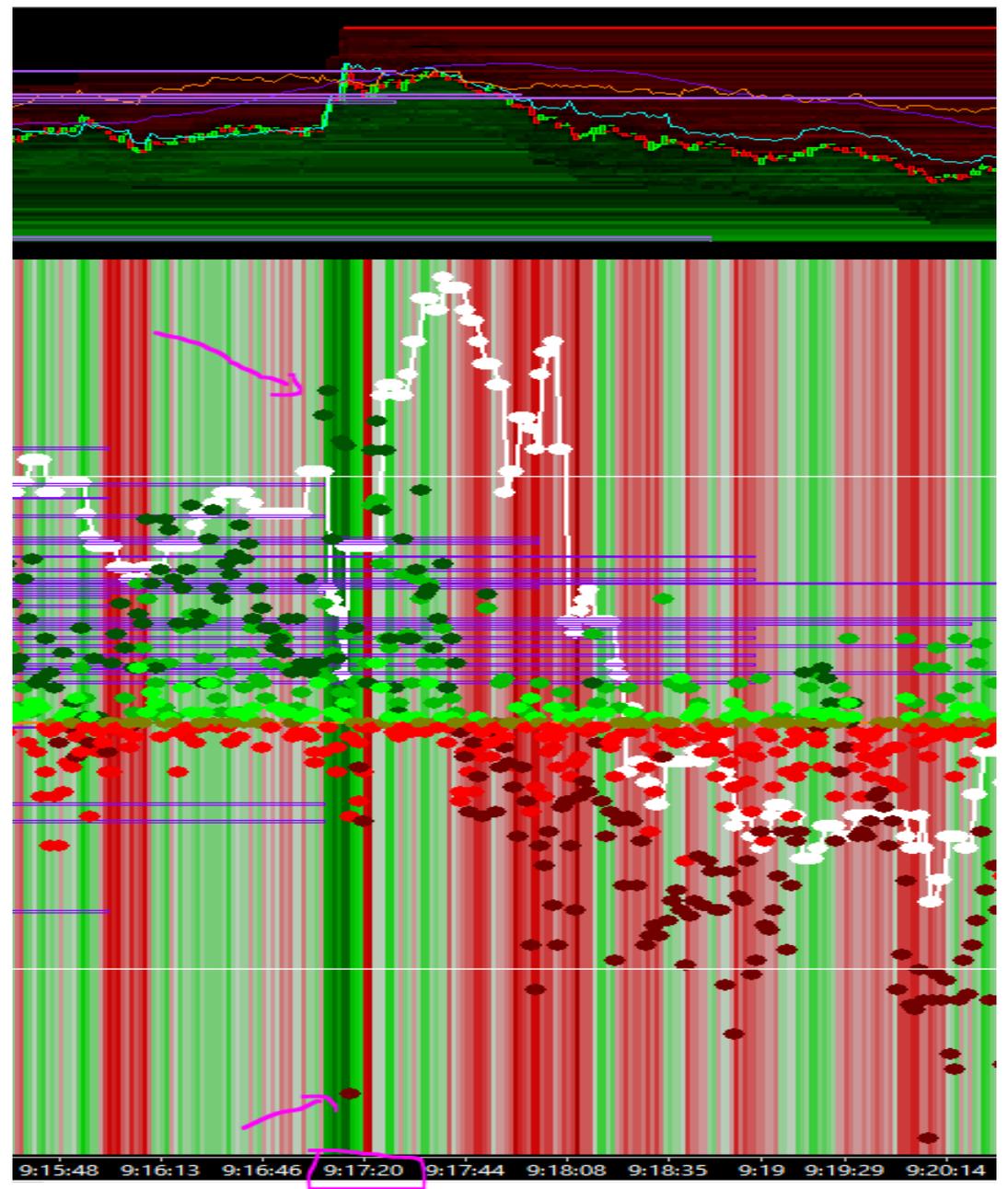
**Note : remember one other key concept :**

- When the price is resting too many times on a price support, it's not a price support
- When the price is resting too many times on a price resistance, it's not a good price resistance and we will probably break it, because the better bottom/top price opportunities are usually made very quickly to prevent some other participants to hit the market in the good direction.

**We can notice that :**

- To build this large delta depth spread, the market maker is sending and removing very fast some large quantities of limit orders from the orderbook in order to put the mess for the other participants, and also to make their data feed lower or to prevent some other participants to sell the extreme high or buy the extrem low. The market maker wants to get this high and low, alone because it's his business.

The same chart example zoomed in on the key area :



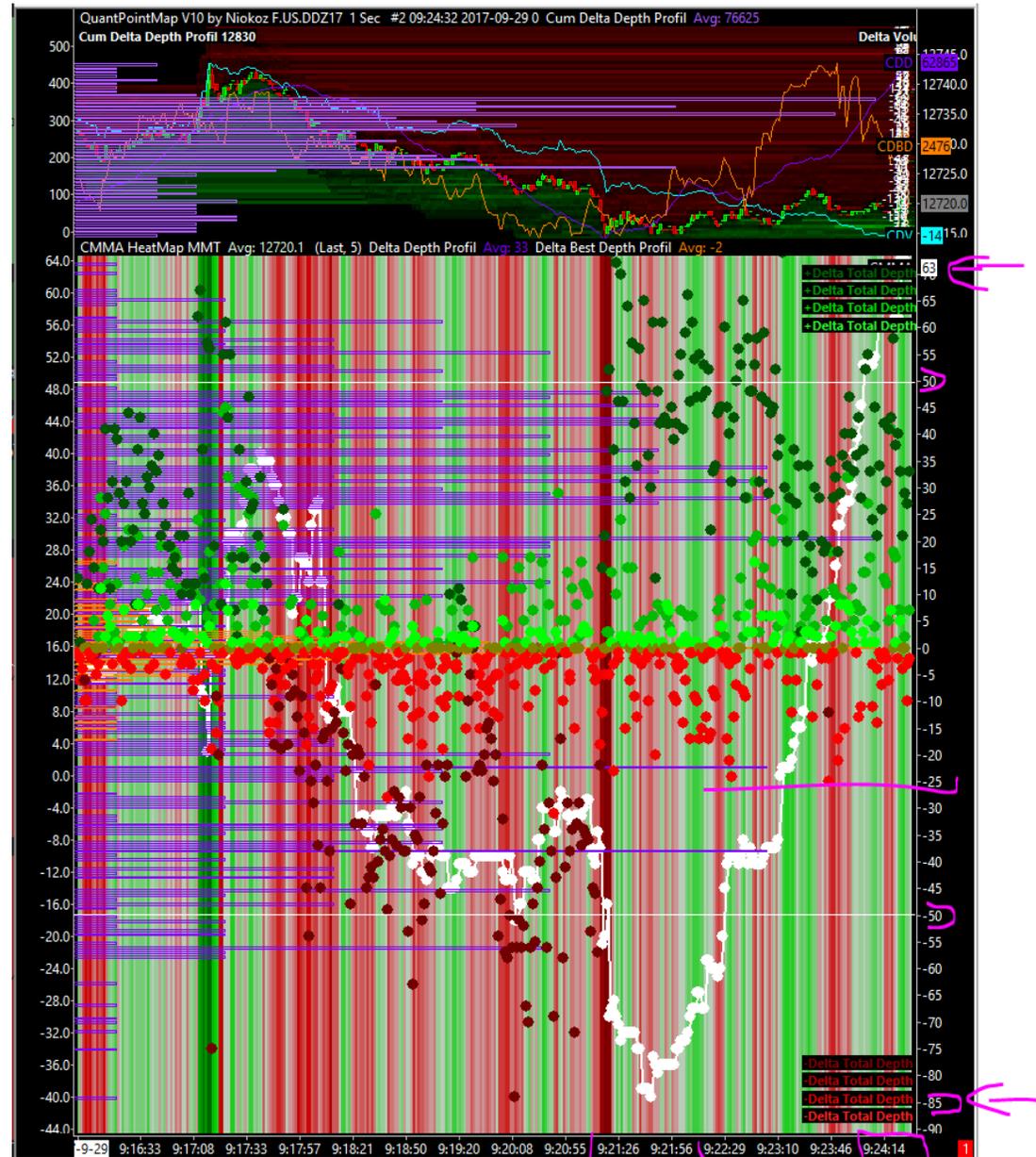
## **B) The CMMA/Depth convergence :**

**W**hen it's a bullish **CMMA/Depth** convergence :

- The **price action** was going down
- The **price action** has made an apparent bottom
- The **price action** is now compressed on a little price range
- The **CDV** is going down on this little price range
- The **CMMA value** is spiking up and/or is reversing strongly from the bottom of the chart, to the top of the chart, very very quickly during this price range phase.
- The **delta depth** green point have a positiv value which is bigger than the delta depth red point.
- There is no **delta depth** red point below the extreme whyte horizontal line value.

This market configuration can look like that on the **Quant PointMap** :

It's a bullish configuration and even if the price is indicating nothing (staying in its little price range) we have the depth structure which indicate that the pressure is becoming bullish, and we have the **CMMA line** which indicates that the execution is more clean on the sell side (it mean that it's more easy to sell at the market than to buy at the market). So the price will goes up.



### C) The Delta Depth Mixing :

For a bearish configuration :

- The **price action** is in a range
- The **delta depth point** are more printed on the negativ side (red point more visible)
- The **CMMA line** has started to fall down
- The color of the **delta depth point** cloud is mixed with dark and light red.

What does that mean ? It means that the bearish pressure from the depth structure is very well mixed, and very well homogeneous ; it's seen as a powerfull bearish pressure.

