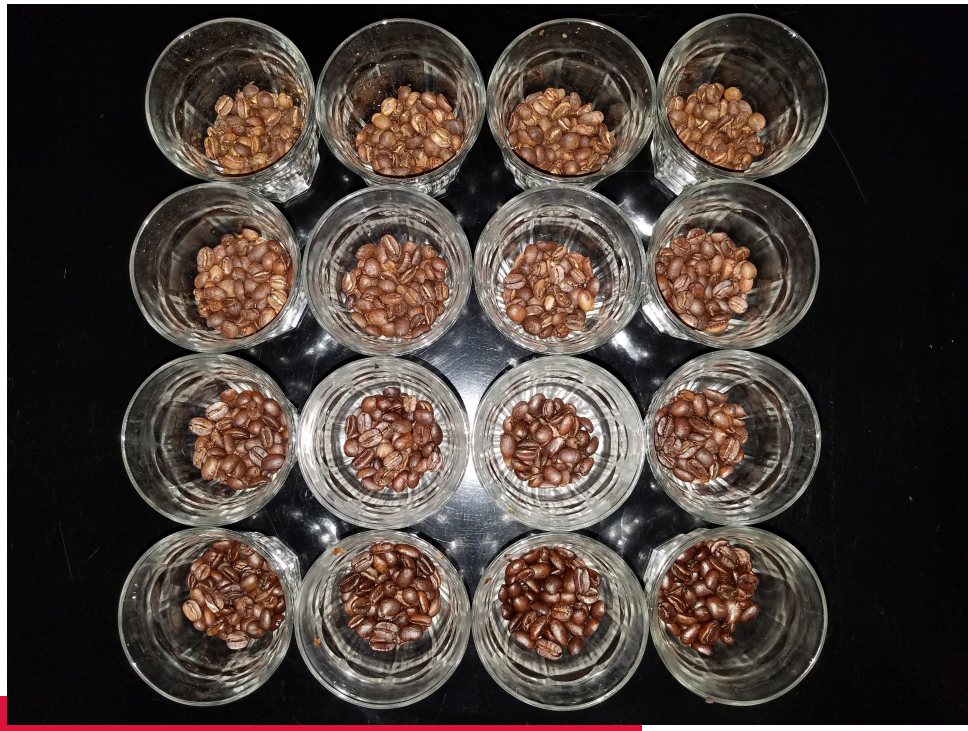


Cups pulled from a single roast of a coffee from Sulawesi representing potential end points between 390°F and 460°F. This coffee develops interesting spicy flavor characteristics that pair well with a heavy body on the darker side of this range.

# Roasting Styles Exploration Kit: Sulawesi Toraja Edition

## KEY POINTS

- Use exploratory methods to reveal the potential flavors of a coffee.
- Align roasting decisions to your product line plan.
- Understand the impact of changes to different parts of a roasting plan.
- Apply methods for repeatable roasting plan design.

Contained in this package you will find one coffee roasted in three distinct ways. When I first started working with my latest lot of coffee from Sulawesi, I was immediately impressed by the clear progression of aromatics as the coffee is roasted darker. I thought this would make an excellent training example and the result is this Roasting Styles Exploration Kit.

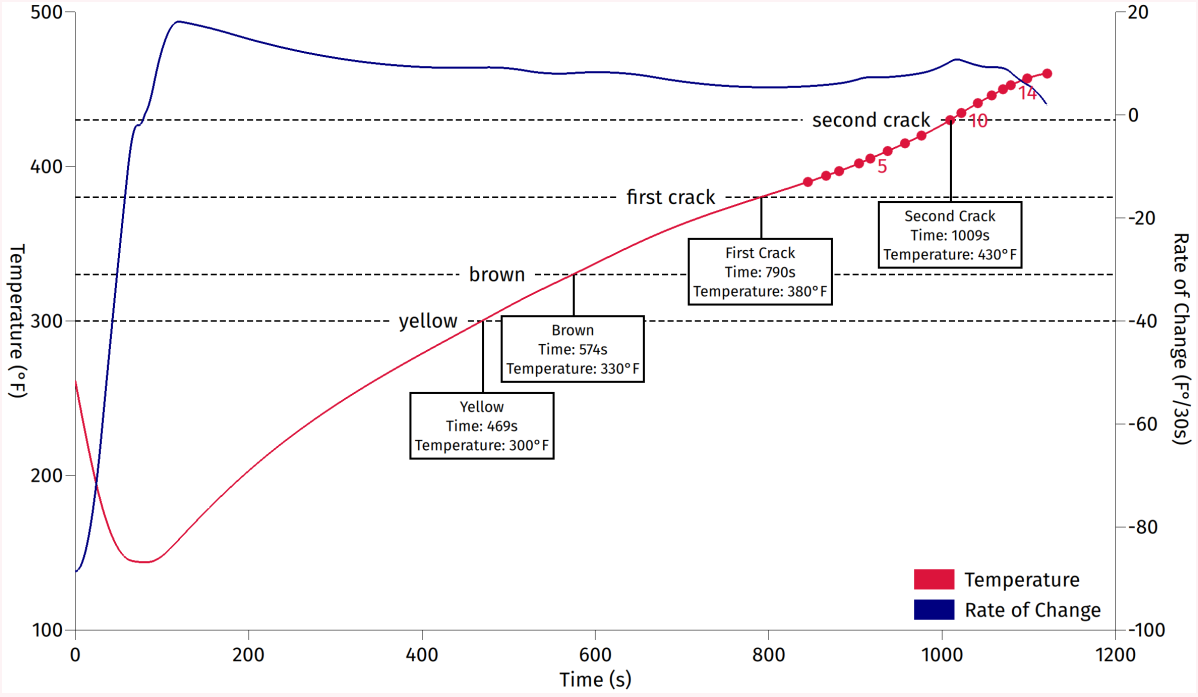
Whenever I have a new lot of coffee, I evaluate this by roasting a small batch of the coffee and using the trier to extract small amounts of the coffee to taste across a range that I hope will extend from coffees that are too light for my intended use through coffees that are too dark. I had intended this coffee as a replacement for my previous lot of coffee from Sulawesi. That had sold as a rich, spicy dark roast coffee, so ordinarily I could have ignored the lighter side of things, but I was also working on writing a new book on roasted coffee product development which required photographs, so I pulled cups across a much broader range.

This initial exploratory roast was performed on a Diedrich IR-1 with a measurement system calibrated to match a larger Diedrich IR-12. The IR-12 was used for later production test batches. One of the ways that I like to think about the impact of roasting decisions is the duration it takes for coffee to pass through distinct ranges. These ranges have boundaries at easily observable physical changes which occur at consistent temperatures. While those temperatures should be consistent, they may not be the same across different coffee roasting machines using different measurement systems. Connecting these ranges to visible and audible changes in the coffee also allows this approach to be used even in the absense of a reliable measurement system, though with less precision. On my machines, the key events are when the coffee begins to change color from green to yellow which happens at 300°F, when the coffee changes color from yellow to brown (330°F), the start of first crack (380°F), and the start of second crack (430°F).

This kind of exploratory roast is only the first step in designing a roasting plan for a new coffee. During this part of the process I am mainly interested in how the coffee changes as it progresses from lighter to darker roasts. I'll still take a guess at the rate I want to progress through different ranges based on past practice and experience with similar coffees, but I'm not obsessing over getting things perfect, especially once I start pulling cups to taste.

For this coffee, I started to pull cups when the coffee reached 390°F. I know from past work that coffees roasted to a cooler end temperature, regardless of the timing involved in reaching that point, have a particular raw coffee flavor that I always find objectionable in a supposedly roasted coffee. The last cup was pulled once the coffee reached an end temperature of 460°F. It has been extremely rare that I've felt a need to roast a coffee darker than that. Half of the cups were pulled prior to the start of second crack.

## Initial Exploratory Roast: Sulawesi Toraja

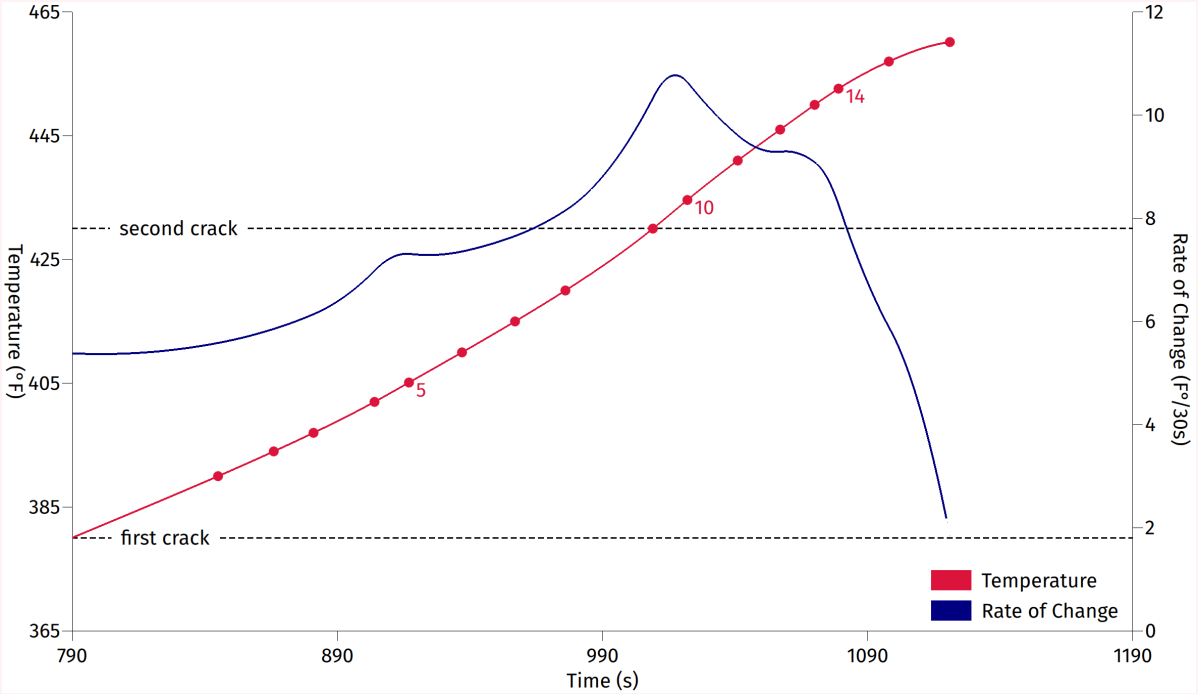



Evaluating this progression on the cupping table I found a floral fragrance which increased in intensity as the roast approached second crack, however the intensity of fragrance dropped at the start of second crack and transformed to a more resinous fragrance. On the 13th cup, the intensity of the fragrance once again increased and from here through the end of this progression, spicy and later smoky aromatics were introduced. While breaking the crust, the aroma of the coffee followed a similar pattern as the fragrance, but caramel aromatics joined the floral aromatics at the fifth through seventh cups.

On the first sip, the first cup was very sweet, but with little body and a lack of other distinguishing characteristics. Body started to increase at the third cup while sweetness diminished at the sixth cup. Resinous flavors still develop at the nineth cup and this is joined by an increased sweetness in the tenth cup. Spicy flavors become apparent starting at the 13th cup and continue through the end, though that spicy flavor is reduced in the final two cups, increasingly replaced by a smoky flavor. The final cups also exhibit a reduction in body.

For use in my product line, cup 14 is the closest to what I want, presenting the

**Initial Exploratory Roast: Sulawesi Toraja (Detail on Cups Pulled)**




best balance of sweet and spicy with good body and just a hint of smoke. The flavor profile is very similar to the previous lot which was roasted a bit darker.

Had I been interested in what I'd consider a medium roast, the tenth cup would be worth closer examination. This cup had great balance with lots of body, good sweetness, and an overall pleasant flavor.

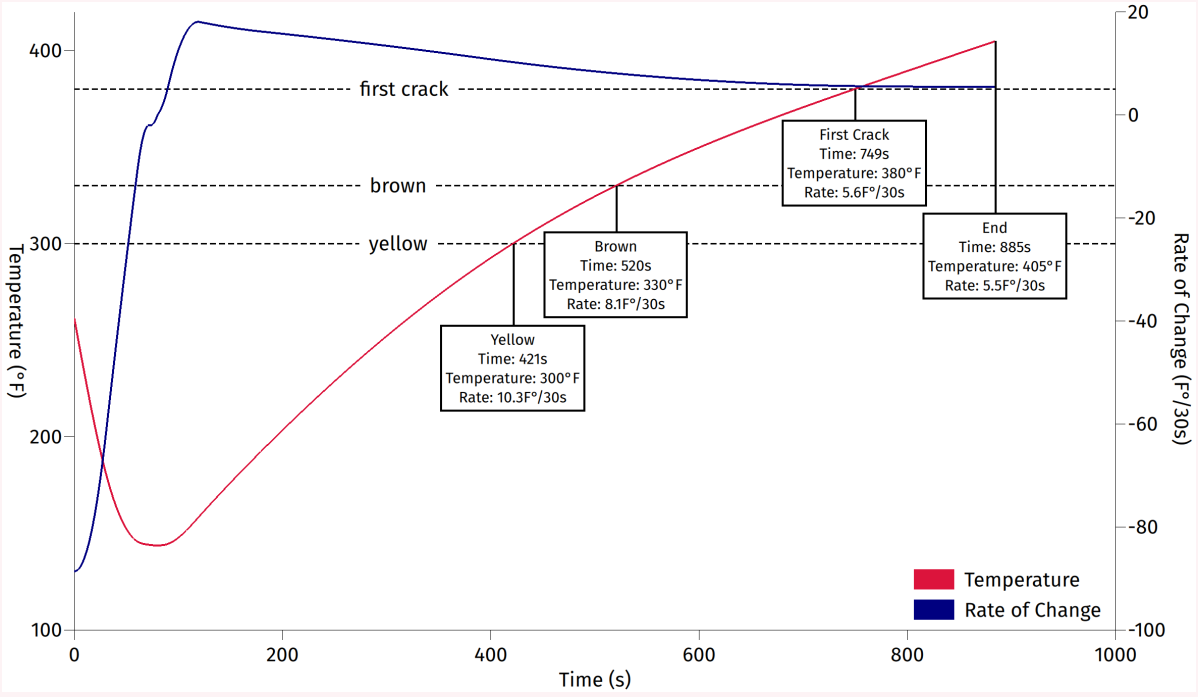
For what I'd consider a light roast, my preference is for the fifth cup. The caramelly sweetness and floral aromatics paired well with a medium body.

Exploratory roasting does not always go so well and sometimes it is worth trying different timing parameters and pulling a new progression, but that was not required with this coffee.

In each of these cases, I believe there is some benefit to creating a new roasting plan, adjusting the timing in different ranges prior to a production test batch rather than simply copying the initial exploratory roast up to each preferred cup.

Only very slight changes to the roasting plan are desired for the light roast. Time while the coffee is yellow is reduced by 6 seconds. This is enough to change the character of the sweetness. Time while the coffee is brown prior to first crack is

## Sulawesi Toraja: Light Roast Plan



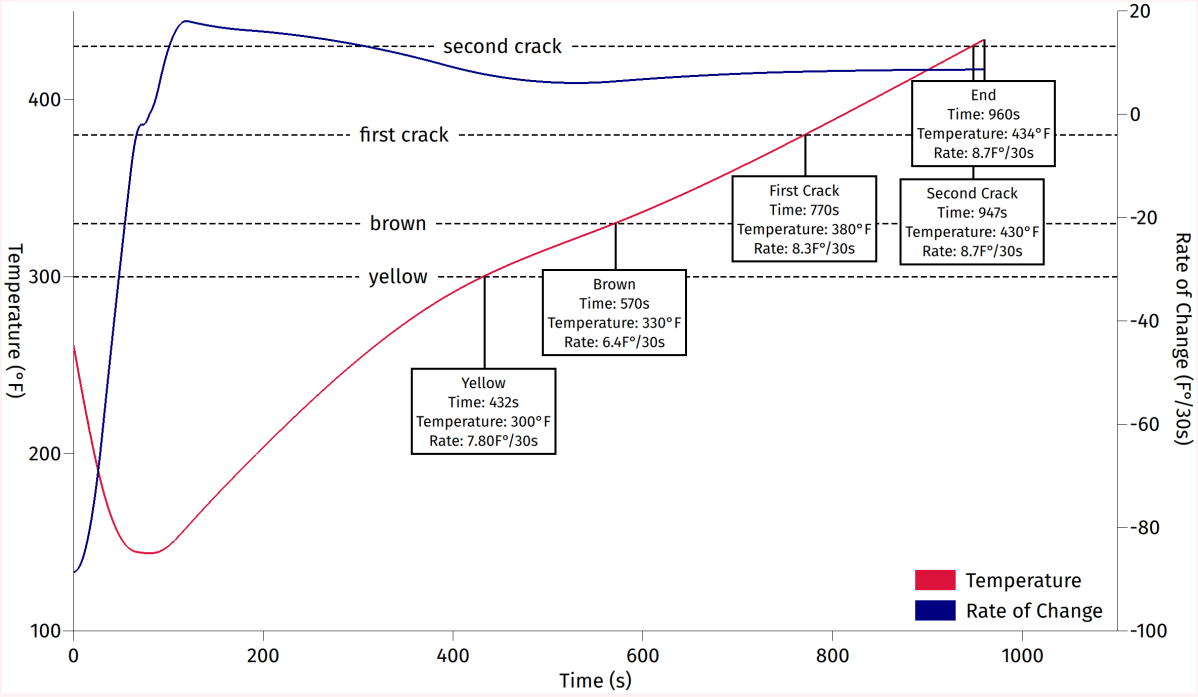

extended by 13 seconds. Time after first crack is also slightly extended by 9 seconds. These changes are intended to bring the acidity up. The largest time difference comes from time while the coffee is still green, but this is only intended to make the roasting plan as a whole easier to replicate. It does not contribute to differences in the flavor.

Roasting the coffee to this plan produced a whole bean degree of roast measurement of 53.5 on the gourmet scale and a ground degree of roast measurement of 64.8. There was a 15.1% reduction in the mass of the coffee.

Tasting this as a drip brewed coffee, the result was a bright but well balanced coffee. The increase in acidity helps transform the perception of sweetness from the candy sweetness observed in the initial exploratory roast to a juicy sweetness. The floral aromatics are also still present.

With the medium roast, I wanted to fully emphasize the potential sweetness of the coffee. The main change to do this was extending time while the coffee is yellow by another 33 seconds. Time while the coffee is brown prior to first crack was reduced by 16 seconds. There is also a large reduction in time between cracks. This range

## Sulawesi Toraja: Medium Roast Plan

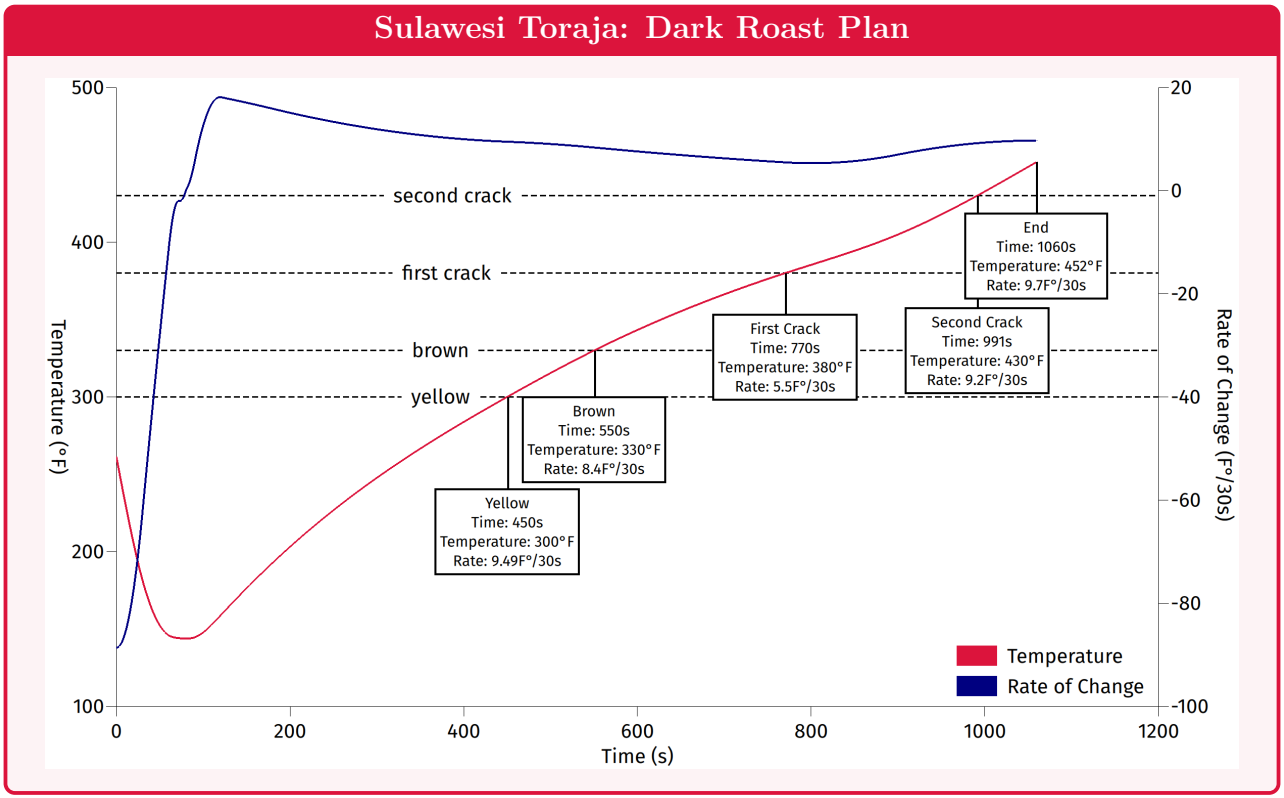



was reduced by 42 seconds.

Degree of roast on a batch of coffee roasted to this plan was 43.5 whole bean, 46.9 ground. A mass loss of 17.23% was recorded.

Brewing a pot of this coffee did, in fact, produce a remarkably sweet result. Before even the first sip, someone might just from the aroma think honey has been added to the coffee. That honey sweetness is the dominant flavor in the cup. The reduction in acidity compared with the light roast and the increase in body makes the resulting brew smooth and easy to drink.

For the dark roast, I don't want to change much compared with cup 14 in the initial exploratory roast. The changes exist mainly to make the overall plan easier to replicate. Note fewer inflections in the rate of temperature change. Time while the coffee is yellow is most similar to the light roast plan and only 5 seconds shorter than in the exploratory roast. Time while the coffee is brown prior to first crack is extended by only 2 seconds. Time after the start of second crack is reduced by only 1 second compared with cup 14 of the exploratory roast. The similarity of this roasting plan to the initial exploratory roast is especially apparent when viewing the



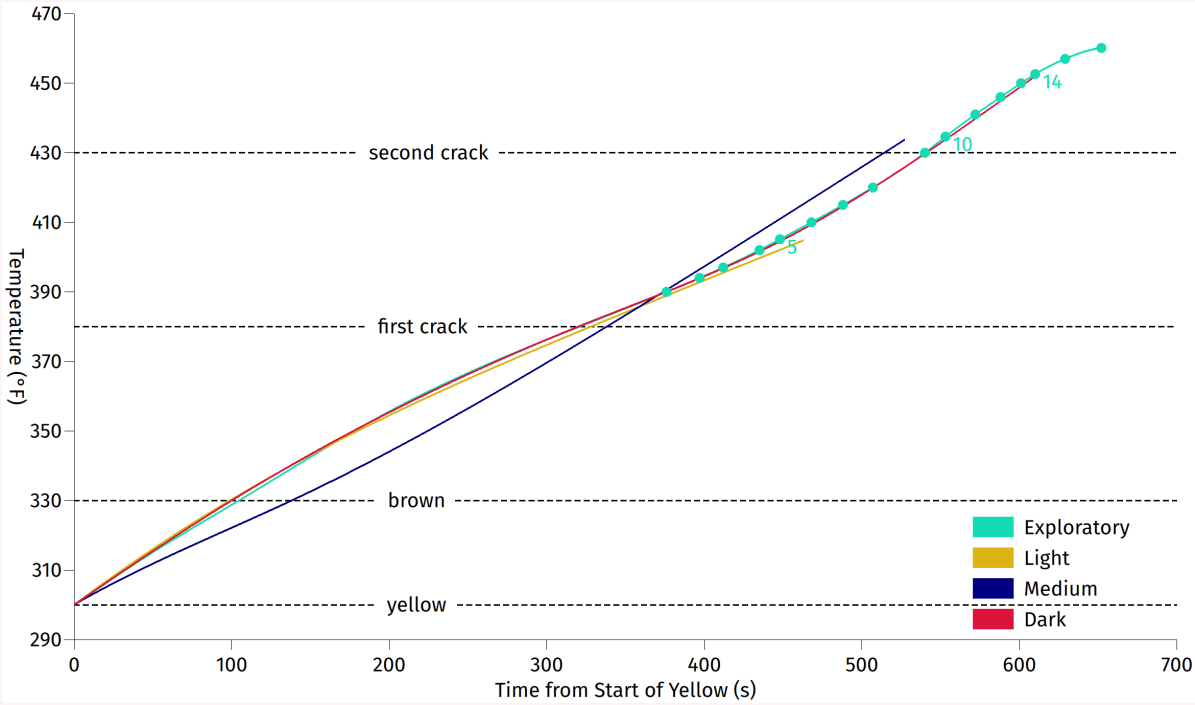

data aligned at the start of color change.

A batch matching this plan resulted in degree of roast measurements of 32.7 whole bean, 33.3 ground. There was a 20.1% reduction in mass for this batch.

Tasting this coffee it is immediately clear that this is a dark roast. While the intensity of sweetness has been reduced, some sweetness is still present and this combines nicely with the clove spice flavor observed in the exploratory roast. There is a bit of smokiness in the first sip, but this diminishes as the coffee cools. The low acidity and heavy body represent a more traditional approach to coffees from this island.

Each of these roasts is something that a roasting company might choose as their treatment of this coffee depending on how they intend this coffee to fit in their product line. While the overall shape of these roasting plans are different from each other, these were chosen to produce specific desired changes in the flavor expressed by this coffee. These were also all a product of the same overall methodology, working from an initial exploratory roast, considering the different flavors exposed by that test, reasoning about specific changes that might produce desired changes to the flavor,

**Four Batches Aligned at the Start of Yellow**




and testing a proposed roasting plan to verify that the results match expectations.

**Upcoming Ebook** For more in depth information on this process, watch for my upcoming Ebook on roasted coffee product development and a print book of coffee roasting exercises. Sign up for the mailing list at:

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to be the first to learn when these are available.